

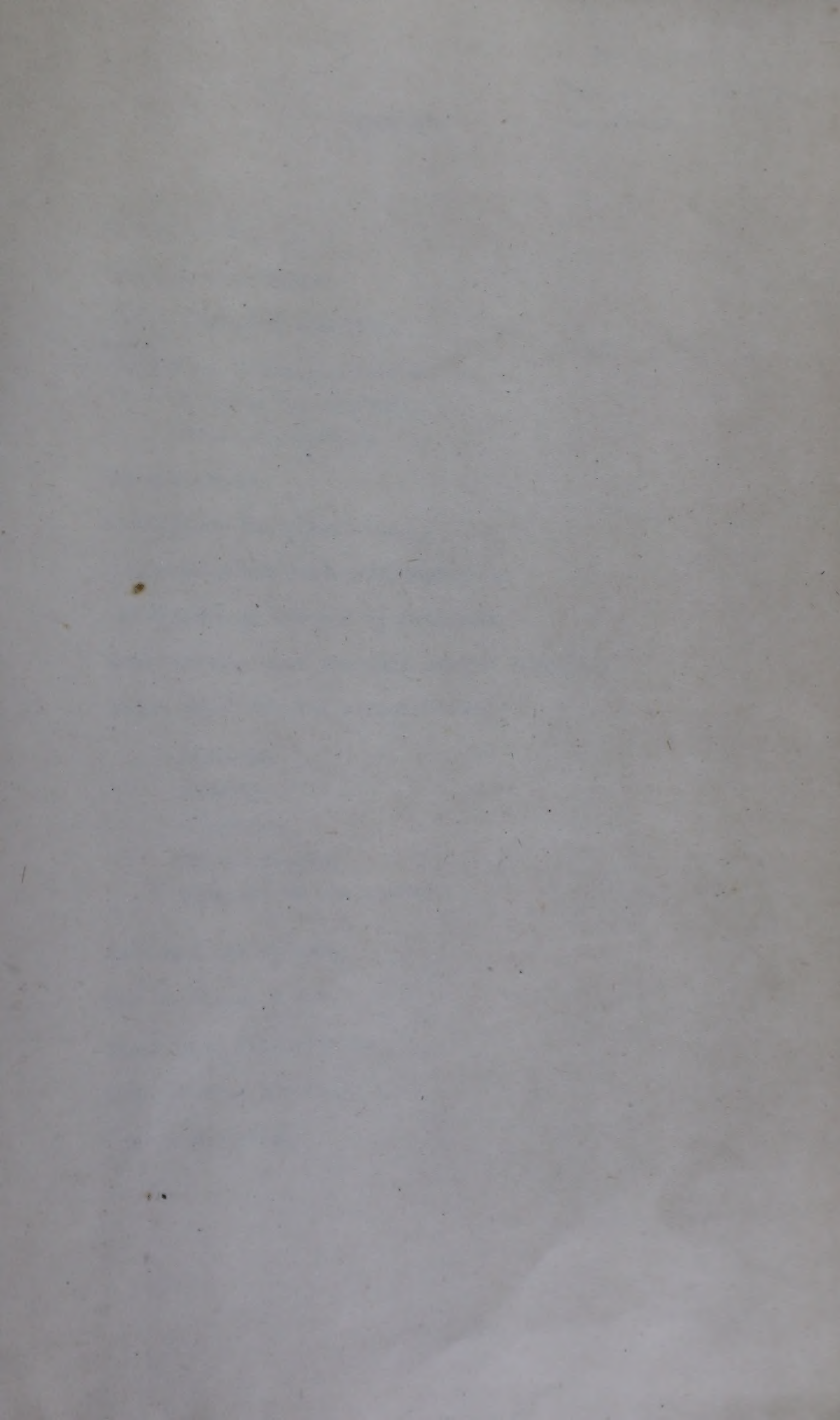
CHAI — CMAI

Joint Hospital Formulary

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- Year of publication should be given
- Some prices are already outdated.

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HOSPITAL Formulary

by CHAI

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01746
DR400
COMMUNITY HEALTH CELL
326, V Main, I Block
Koramangala
Bangalore-560034
India

Introduction

This Hospital Formulary is ~~in~~ for the guidance of doctors, pharmacists, nurses, and other health personnel at health care institutions affiliated to the Catholic Hospital Association of India and the Christian Hospital Association of India (about 2300 institutions). It is hoped that other health care institutions will also find it useful. Our hope is that soon a new National Formulary will emerge, which might find this formulary useful.

Medical

2. It is a pocket book for ready reference; it is expected that all those prescribing these drugs are conversant with the therapeutic and pharmacological effects of the drugs included in the formulary.

3. The items have been chosen on the basis of need, efficacy and cost. We have selected a few brand names. It does not mean that these are the only ones or even the best. It is hoped that with good quality control it will be possible to use generic (medical) names only and do away with brand names.

4. The formulary will be revised periodically and updated; suggestions for improvement are welcome and should be sent to the two Associations.

5. All care has been exercised in the preparation of the formulary but there can be mistakes. All those who prescribe are requested to check as to the corrections.

GENERAL INFORMATION

Make yourself familiar with the formulary. Read through ^{it} at least once before use.

The formulary contains the generic and brand names (with the name of the manufacturer) of the drugs and formulations, in 24 sections, with subsections. Some of the sections have short informative notes. The indications, contra-indications, caution, side effects, special precautions and dosage are given; these are not exhaustive and the doctor must exercise his/her judgement while prescribing any drug to meet the needs of the particular patient. The preparations and the cost are shown; the cost may vary and revisions can occur.

Index: Both generic and brand names of the drugs included in the text are included in the index, giving the page numbers.

CHAI - CMAI
JOINT FORMULARY COMMITTEE

Chairman

Dr. C.M. Francis,

Members

Mr. Alan Crammer, Mysore

Dr. Louisa Emmanuel, Hyderabad

Mr. V.C. Idiculla, Cochin

Dr. Stanley C. Macaden, Bangalore

Dr. Prem Pais, Bangalore

Dr. (Mrs) Molly Thomas, Vellore

The Committee had a large number of sittings to prepare the joint formulary. The Committee is thankful to all those who have helped in the making of the formulary. The Chairman is thankful to the members for their help and persevering efforts.

The Committee invites suggestions for the improvement of the formulary such that the formulary can be updated and effective, quality drugs with good benefit/risk ratio can be made available economically to our patients.

REFERENCE GUIDES AND TABLES

Weights and Measures

<u>Mass</u>	1 kilogram (kg)	=	1000 gram (g)
	1 gram (g)	=	1000 milligram (mg)
	1 milligram (mg)	=	1000 microgram
<u>Volume</u>	1 litre	=	1000 millilitre (ml)
	1 pint	=	560 millilitre (ml)

Approximate Domestic Equivalents

1 ounce	=	30 grams (g)
1 fluid ounce	=	30 millilitre (ml)
1 tablespoonful	=	15 millilitre (ml)
1 teaspoonful	=	5 millilitre (ml)

All liquid medicines should be measured with a graduated medicinal spoon.

Calculation of Children's Doses

Wherever available, experimentally or clinically established children's doses should be used.

Several formulae have been devised for calculating children's doses from doses known to be effective in adults. They are based on age, weight, body surface area or a combination of these. Certain fundamental physiologic properties are proportional to two-thirds power of body weight rather than the body weight itself, and a similar proportionality holds for the body surface area.

The two following methods of calculation may be useful in different circumstances:

Clark's Rule

$$\text{Child's dose} = \frac{\text{weight of child (Kg)}}{70} \times \text{adult dose}$$

Young's Rule

$$\text{Child's dose} = \frac{\text{Age (in years)}}{\text{Age} + 12} \times \text{adult dose}$$

Milliequivalents

Definition A milliequivalent (mEq) weight is 1/1000 of an equivalent weight. An equivalent weight of an element is the atomic weight expressed in grams, divided by its valency.

This is a unit of measurement of the chemical activity of an electrolyte, and is related to the total number of ionic charges in solution, taking note of the valency.

$$\text{One milliequivalent} = \frac{\text{atomic weight in milligrams}}{\text{valency}}$$

$$\text{e.g. } 1 \text{ mEq Na}^+ = \frac{23}{1} = 23 \text{ mg}$$

$$1 \text{ mEq Cl}^- = \frac{35.5}{1} = 35.5 \text{ mg}$$

Thus a solution containing 1 mEq of sodium per litre contains 23 mg sodium. A solution containing 1 mEq of sodium and 1 mEq of chloride contains 23 mg Na^+ and 35.5 mg Cl^- , i.e. 58.5 mg sodium chloride per litre.

In a salt containing ions of different valencies the weight of a salt containing 1 mEq of a specified ion is calculated as follows:

$$\frac{\text{sum of the atomic weights}}{\text{valency of the specified ion} \times \text{no. of specified ions in molecule}}$$

Example Find the weight of magnesium chloride ($\text{MgCl}_2, 6\text{H}_2\text{O}$) required to prepare a solution containing 1 mEq of magnesium per litre

$$\begin{aligned} & \frac{24.3 \times (2 \times 35.5) + 6(2 \times 1 + 16)}{2 \times 1} \\ &= 101.7 \text{ mg MgCl}_2, 6\text{H}_2\text{O} \end{aligned}$$

For the conversion of grams per 100ml (percentage) of a solution to milliequivalents/litre the following formula may be used:

$$\text{mEq per litre} = \frac{\text{percentage strength} \times 10000}{\text{milligrams containing 1 mEq salt}}$$

Example Find the number of milliequivalents of Na^+ per litre contained in a sodium chloride injection 0.9%. (1 mEq sodium is contained in 58.5 mg sodium chloride)

$$\begin{aligned} \text{mEq per litre of Na}^+ \text{ in sodium} &= \frac{0.9 \times 10000}{58.5} \\ \text{chloride 0.9\% solution} & \\ &= 154 \text{ approximately} \end{aligned}$$

A table is attached showing the milliequivalents of a salt containing 1 mEq of a specified ion.

Milliequivalents of a salt containing 1 mEq of a specified ion

Ion	Milliequi- valent (mEq) mg	Salt	Milligrammes of salt containing 1 mEq of the specified ion
Ca^{2+}	20.0	Calcium Chloride, $\text{CaCl}_2 \cdot 2\text{H}_2\text{O}$	79
		Calcium Gluconate, $\text{C}_{12}\text{H}_{22}\text{CaO}_{14}\text{H}_2\text{O}$	224
		Calcium Lactate, $\text{C}_6\text{H}_{10}\text{CaO}_6 \cdot 5\text{H}_2\text{O}$	154
K^+	39.1	Potassium Chloride, KCl	74.5
		Potassium Citrate, $\text{C}_6\text{H}_5\text{K}_3\text{O}_7 \cdot \text{H}_2\text{O}$	108
Mg^{2+}	12.15	Magnesium Sulphate, $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$	123
Na^+	23.0	Sodium Acetate, $\text{C}_2\text{H}_3\text{O}_2\text{Na} \cdot 3\text{H}_2\text{O}$	136
		Sodium Acid Citrate, $\text{C}_6\text{H}_6\text{Na}_2\text{O}_7 \cdot 1\frac{1}{2}\text{H}_2\text{O}$	131
		Sodium Acid Phosphate, $\text{NaH}_2\text{PO}_4 \cdot 2\text{H}_2\text{O}$	156
		Sodium Bicarbonate, NaHCO_3	84
		Sodium Chloride, NaCl	58.5
		Sodium Citrate, $\text{C}_6\text{H}_5\text{Na}_3\text{O}_7 \cdot 2\text{H}_2\text{O}$	98
		Sodium Lactate*	
Cl^-	35.5	Calcium Chloride, $\text{CaCl}_2 \cdot 2\text{H}_2\text{O}$	73.5
		Potassium Chloride, KCl	74.5
		Sodium Chloride, NaCl	58.5
$\text{C}_2\text{H}_3\text{O}_2^-$ (Acetate)	59.0	Sodium Acetate, $\text{C}_2\text{H}_3\text{O}_2\text{Na} \cdot 3\text{H}_2\text{O}$	136
$\text{C}_3\text{H}_5\text{O}_3^-$ (Lactate)	89.0	Calcium Lactate, $\text{C}_6\text{H}_{10}\text{CaO}_6 \cdot 5\text{H}_2\text{O}$	154
		Sodium Lactate, *	
HCO_3^-	61.0	Sodium Bicarbonate, NaHCO_3	84

* Prepared in solution by neutralising lactic acid with sodium hydroxide:
1.0 ml of 1M sodium lactate contains the equivalent of 112 mg.

Abbreviations in Common Use

<u>Latin</u>	<u>Abbreviation</u>	<u>English</u>
Ad	Ad	to, up to
Ana	a.a.	of each
Ante	a.	before
Ante cibos	a.c.	before food
Dis in die	b.i.d.	twice a day
Bis die sumendum	b.d.s.	twice a day
Capsula	cap.	Capsule
Gutta	gut.	drop
Hora somni	h.s.	at bedtime
Nocte	noct.	night
Octarium	o.	pint
Omni die	o.d.	every day
Per os	p.o.	by mouth
Post cibos	p.c.	after food
Pro re nata	p.r.n.	as needed
Quantum sufficit	q.s.	a sufficient quantity
Quater in die	q.i.d.	four times a day
Quinque quateur hora	q.q.h. (q.4.h)	every four hours
Si opus sit	s.o.s.	if needed
Statum	stat.	at once
Syrupus	syr.	syrup
Tabella	tab.	tablet
Ter in die	t.i.d.	three times a day
Ter die sumendum	t.d.s.	three times a day
Tincture	tinct.	tincture
Unguentum	ung.	ointment

Others

C.I.	:	Contra-indications
D.I.	:	Drug interactions
I.M.	:	Intramuscular
I.V.	:	Intravenous
Max.	:	Maximum
Prep.	:	Preparation
S.C.	:	Subcutaneous
S.E.	:	Side effects
S.P.	:	Special precautions
tsp.	:	Teaspoonful

Guidelines for prescribing

1. The Hospital Formulary has been drawn up with the guidance of the World Health Organisation List of Essential medicines, the British National Formulary and other authoritative lists, and contains a wide range of items. Prescribe from this formulary. If other items are required, please get the approval of your hospital.
2. Prescribe a drug only if there is a good indication and the benefit-risk ratio is good.
3. The drug must be efficient and cost effective. When considering the cost think of it for the entire treatment and not merely a single dose.
4. Prescribe as few medicines as possible. Patient compliance is greatly reduced as the number of medicines is increased. Financial constraints may result in incomplete courses being taken, or the patient selecting himself only some of the items which have been ordered. It would also reduce the possibility of drug interactions.
5. Prescriptions must be written legibly and in ink.
6. Prescriptions must show the following details:
 - a. Name of patient
 - b. Age of patient
 - c. Hospital registration number
 - d. Date
 - e. Name of the medicine - preferably the generic name, if not the patent name in this Formulary
 - f. Do not use abbreviations for the names of drugs. You may cause the pharmacist to dispense inaccurately.
 - g. The form of the medicine - injection, tablet, etc.
 - h. The amount of medicine to be dispensed written in the metric system only, as follows:

Above one gram 1 g

less than 1 gram in milligrams (mg) (500mg rather than 0.5g)

less than 1 mg write micrograms in full (not 0.1mg for example)

Where decimals are unavoidable always write a '0' in front of the decimal point e.g. 0.5 g not .5 g.

The amount to be dispensed should be the total number of doses for tablets and injections, and the total volume in the case of liquids. Alternatively the number of days of treatment can be written. Remember the pharmacist cannot calculate the quantity to be dispensed for instructions such as 'when necessary' or when lotions and ointments are prescribed.

1. The directions to the patient which the pharmacist has to

write on the label, and explain to the patient.

- j. The doctor's signature in full; initials are not acceptable.
7. Give clear instructions to the patient, and in the case of children and those who cannot understand, to the relatives.
8. If an overdose or an unusually high or low dose is prescribed endorse the prescription 'quantity verified'.
9. To avoid wastage of medicines for inpatients (and unnecessary refunds) prescribe not more than one week's requirement. For the initial antibiotic order prescribe a maximum of three days medicine.
10. To avoid drug interactions always ask the patient if he is taking any other drug, including household remedies.
11. Ask the patient whether there have been previous reactions to a particular drug and to drugs in general
12. Inform the patient that any drug may produce adverse reactions and that such reactions must be reported promptly.
13. For prescribing in pregnancy, for children, the elderly and those suffering from hepatic disease or renal impairment, see the notes 'Prescribing under special circumstances'.
14. Dangerous Drugs (e.g. pethidine, morphine, cocaine) when prescribed and dispensed are subject to special records and have to be reported to the State Government. The dose, and the quantity to be supplied should be stated in words and figures.

No clinician may prescribe dangerous drugs for himself or for his family. Any such requirements must be written by the senior doctor supervising the treatment.

15. Treatment with drugs is only one part of the management of patients. Use other methods of management also to restore the patient to health.

Guidelines for Dispensing Medicines

1. Read the prescription twice. Ensure that all the required details are given, such as patient's name, age, hospital number, date, medicine, strength of medicine, quantity, directions, and full signature of the doctor.
2. If in doubt about any details consult your pharmacist colleague. Listen to his interpretation before you give yours. If still in doubt consult the prescriber or another doctor who has access to the patient's records.
3. Dispense each item on the prescription carefully. Check the label on the container as you take it from the shelf, again as you remove the contents, and again as you replace it on the shelf. If possible get another pharmacist to check what you have dispensed. Patient safety is the first consideration at all times.
4. You may substitute one brand for another of a prescribed medicine. You must not substitute another drug for the one prescribed.
5. Write the labels clearly in ink and include the following:
 - a. Generic name of the medicine (If a compound with no generic name the patent name may be used)
 - b. The form of the medicine, tablet, injection, etc.
 - c. The strength of the medicine
 - d. The directions for use
 - e. Warning labels where necessary, e.g. 'for external use only'
 - f. The patient's name
 - g. The name and address of the Hospital (This will normally be printed on the label)

The label should be in a language the patient can read. For illiterate patients symbols may be used in addition to the written instructions. Preferably ask another pharmacist to check the labels.

6. Make the records required by law and/or by the rules of the Hospital.
7. Give the medicines to the patient, and ensure that he understands how the medicines are to be used.
8. Retain the prescription for the pharmacy records.
9. Dispense only prescriptions written by the hospital doctors for patients registered by the hospital records office.
10. Where there is any doubt about the authenticity of a prescription, especially for scheduled medicines or narcotics, it is the

pharmacist's legal responsibility to check with the prescriber before making the supply.

11. Increase your knowledge of the medicines you dispense by reading the package inserts, and especially the reference books in the pharmacy. This will enable you to give better service to the patients, doctors and nurses.
12. Maintain a high standard of professional conduct at all times in relation to dress, tidiness of the pharmacy benches, fittings and floor space. Remember you represent the profession at all times, and from you the patients will have a lasting impression of the institution.

Guidelines on Storage of Medicines

1. Store medicines in a cool, dry place.
2. Storage places must be free from infestation with rats, cockroaches, ants, etc.
3. Vaccines and other biological products must be stored between 2° and 8°C in a refrigerator. They must not be frozen. A common exception to this rule is polio vaccine which is usually stored frozen. Check labels for the correct storage temperatures. The shelves near the refrigerator freezing compartment will be at a lower temperature than the shelves at the bottom of the refrigerator. Check the temperature using a thermometer.
4. Stability of vaccines and biologicals under the 2° to 8°C range is variable. Whenever they have to be carried outside the institution they should be carried in a flask containing ice.
5. Note that many antibiotics should be stored below 25°C.
6. Always ensure that all types of pharmacy stock are used in rotation, 'First in, first out' rule should be followed.
7. Observe the expiry dates on medicines. Strict rotation of stock will help with this. It is an offence under the Drugs and Cosmetics Act to keep in the pharmacy or pharmacy store any out-dated items.
8. In the pharmacy keep all medicines in their original containers as far as possible. Some medicines may need special storage conditions, e.g., protect from light. These conditions must be observed when transferring to containers for departmental or patient use.
9. Advise patients on the safe storage of their medicines at home, and particularly to keep them out of the reach of children.
10. Rules for the management of the pharmacy store and pharmacy are given in other publications.

Constitution and use of some commonly used intravenous infusions:

Aminophyllin

- Loading dose - 5mg/kg i.v. slowly, over 20 min. preferably while patient is receiving oxygen. Loading dose should be omitted or halved in patients who are already on maintenance aminophyllin.
- Maintenance i.v. infusion - 500 mg to be added to one unit of 5% dextrose or n-saline. This gives a conc. of approx 1 mgm/ml. Infusion rate 0.5 - 0.75 mgm/kg/hr for non smoking adults, 1 mgm/kg/hr. for adolescents, children and smokers and 0.4 - 0.5 mg/kg/hr for the elderly and those with CCF or liver disease. For practical purposes no. of mgm/hour = no. of ml/hour.*

Lignocaine

- Use 2% preparation for intravenous use without adrenaline (eg. xylocard, gesicard)
- Loading dose - initial bolus of 1.5 mg/kg (75-100 mgm), followed 15 min. later by second bolus of half this quantity.
- Maintenance infusion - to be started with first loading dose - Add 50ml of 2% ligocaine (1 g) to 500ml of 5% dextrose (40ml to be discarded from pint). This gives a conc. of 2 mgm/ml.*

This is to be run at a rate of 1 mg (0.5ml) to 4 mg (2.0 ml) per minute as needed. Solution should be made fresh every 24 hours. If the larger dose is required 2 g of ligocaine (100 ml of 2% sol) may be added to 400 ml to give a concentration of 4mg/ml. Lower doses are indicated in patients with CCF and liver failure.

Dopamine

- Infusion solution - Add 400 mg Dopamine to 500ml of N-saline or 5% dextose. This gives a concentration of 0.8 mg/ml* or 800 microgram/ml.*
- Solution should be made fresh every 24 hours.
- Dose used 2-10 microgram/kg/min. - Beta-adrenergic effect
10-20 microgram/kg/min. - Alpha-adrenergic effect

If large doses are required 800 mg of dopamine may be added to 500ml, giving a concentration of 1.6 mg/ml or 1600 microgram/ml. This will minimise the volume of fluid infused. Soda bicarb should not be added.

- * With a regular drip set, 1ml = 15 drops; with a microdrip set 1 ml = 60 drops. Hence 1 ml/minute = 15 drops/min, with usual drip set or 60 drops/minute with a microdrip set. The latter are useful when small volumes (0.25 - 0.5ml/min.) have to be used.

Drugs under special circumstances

There are many situations, when special care has to be exercised while prescribing drugs. Among them are

1. age - children and elderly
2. pregnancy
3. breast-feeding
4. hepatic disease
5. renal disease

Caution must be exercised in all these situations so that the risks can be reduced.

Children

Children differ from adults in the response to drugs. This is especially so in the neonatal period. The risk of toxicity is greater in children because of

1. deficient metabolic processes
2. inefficient renal clearance
3. different organ sensitivities, and
4. inadequate detoxifying systems

Prescriptions should always state the age of the child.

Some drugs are contra-indicated in children. In other instances, the dose of the drug may have to be adjusted individually or based on weight, age or surface area of the child. Oral preparations are usually given by spoon and hence, the parents must be instructed in the use of the appropriate spoon.

Medicines should not be added to the contents of the infant's feeding bottle. The drug may interact with milk or the infant may not drink all the milk.

Elderly

Older patients may receive multiple drugs for the various diseases or symptoms, increasing the danger of interactions. Many diseases are psychosomatic; drugs are a poor remedy.

The absorption, metabolism and excretion of drugs are altered in old age. There may be decrease in metabolism in the liver as also decreased renal clearance. The bound portion of the drug may be reduced because of less proteins. All these can produce increase in plasma or tissue concentration.

The questions to be asked are

- 1) Does this patient really require the drug?
- 2) What should be the dose initially? Usually it will be less than that recommended for the younger patient.
- 3) What should be the maintenance dose? Often, it is significantly less than ^{for} the younger subject.
- 4) Are there acute episodes of intercurrent illness, with dehydration and decrease in renal clearance?

Adverse reactions occur commonly to hypnotics (they often have plasma half-lives of 30 hours or more), diuretics, drugs used in parkinsonism and hypertension, and psychotropics.

Patient compliance may be poor in older patients. The instructions must be explicit and simple, the containers must be marked clearly and drug regimens should be simplified.

Pregnancy

All drugs are better avoided in pregnancy, especially during the first trimester. We seldom ask the patient whether she is pregnant. Drugs should be prescribed only if absolutely essential and that too in the smallest effective dose. Some drugs are absolutely contra-indicated.

Drugs to be avoided or used with caution in pregnancy (examples)

1. Alimentary tract - Stimulant laxatives - Avoid during pregnancy.
Sulphasalazine - avoid during 3rd trimester.

2. Cardiovascular System

Diuretics: Avoid during third trimester (to treat hypertension). Thiazides may cause thrombocytopenia in 3rd trimester.

Antidysrhythmic: Amiodarone-avoid during 2nd and 3rd trimesters

Antihypertensives: Guanethidine, diazoxide and reserpine - Avoid during 3rd Trimester.

Vasodilators: Nifedipine - Avoid during 3rd trimester.

Vasoconstrictors: Metaraminol; Nonadrenaline - Avoid during pregnancy.

3. Blood

Anticoagulants: Heparin and oral coagulants - avoid during pregnancy.

Fibrinolytic agents; Streptokinase; urokinase - Avoid during pregnancy.

4. Respiratory System

Aminophylline: Avoid during 3rd trimester.

Salbutamol: Reduce dose during 3rd trimester.

5. Central Nervous System

Hypnotics & sedatives: Avoid during 3rd trimester. Avoid alcohol. Barbiturates-avoid during 3rd trimester. Benzodiazepenes-Avoid large doses.

Antipsychotic drugs: Lithium-Avoid during pregnancy.
Phenothiazine derivatives-Avoid during 3rd trimester.

Anti-depressants: Tricyclics: Avoid

6. Analgesics & anti-inflammatory: Aspirin, Indomethacin, Naproxen - Avoid during 3rd trimester.

Narcotics: Dextropropoxyphene, diamorphine and Pentazocine - Avoid during 3rd trimester.

Antimigraine: Ergotamine - Avoid during pregnancy.
Phenytoin, Phenobarbitone - congenital malformation possible.
Sodium valproate - avoid first trimester.

7. Anti-bacterial

Aminoglycosides: Risk of auditory or vestibular damages, greater with streptomycin, kanamycin. Chloramphenicol, dapsone, Rifampicin, Sulphonamides; avoid during 3rd trimester.

Tetracyclines: Avoid 2nd and 3rd trimester

Trimethoprim: Avoid 1st trimester.

8. Antimalarials: (Benefit outweighs risk) -

Avoid, if possible primaquine during 3rd trimester and pyrimethamine and quinine during 1st trimester.

9. Endocrine System: Oral hypoglycaemics:

Substitute insulin during 3rd trimester.

Antithyroid: Carbimazole, iodine, prophythiouracil-avoid during 2nd and 3rd trimester.

Radioactive iodine-Avoid.

10. Sex hormones: Androgens, oestrogens, progestogens (high dose) - avoid.
11. Skin: Providone - iodine - avoid during 2nd and 3rd trimester.
12. Vaccines: Live vaccines may produce congenital malformation during 1st trimester.
13. Anaesthetics: Inhalation and intravenous anaesthetics can depress neonatal respiration during 3rd trimester.

Local anaesthetic - Procaine: neonatal methaemoglobinaemia during 3rd trimester.

Neostigmine - 3rd trimester: neonatal myasthenia gravis with large doses.

Breast-feeding

Drugs administered to a nursing mother may cause toxicity to the infant. Only very essential drugs should be given to lactating mother. Again some drugs are absolutely contraindicated.

Drugs to be avoided or to be used with caution in breast feeding (examples)

1. Alimentary System

- i. Atropine: Avoid, if possible.
- ii. Laxative: Anthroquinones, phenolphthalein-avoid.

2. Cardiovascular System

- i. Amidarone: Avoid
- ii. Beta-adrenoceptor blockers: Monitor infant.

3. Blood: Oral anticoagulants: Risk of haemorrhage.

4. Respiratory System

- i. Aminophylline: Irritability in infants.
- ii. Cough mixtures containing iodides: use alternative cough mixtures.

5. Central Nervous System

- i. Hypnotics & sedatives: Avoid alcohol, barbiturates, benzodiazepenes, bromide, chloral hydrate, meprobamate.
- ii. Antipsychotics: Haloperidol, phenothiazines and lithium salts - monitor infant.
- iii. Antimigraine: Ergotamine-avoid, if possible.
- iv. Anti-epileptics: Phenobarbitone; primidone-Avoid, when possible.

6. Narcotic Analgics: Diamorphine, morphine and methadone-withdrawal symptoms occur in infant.

7. Anti-infective: Chloramphenicol-may cause bone-marrow toxicity in infant. Dapsone-slight risk of haemolytic anaemia in infant. Nalidixic acid-may cause haemolytic anaemia. Isoniazid-risk of convulsions and neuropathy. Metronidazole-bitter taste to milk. Penicillins-Possibility of hypersensitivity in infant. Sulphanamides & cotrimoxazole-monitor infant. Tetracyclines-avoid.

8. Endocrine System

- i. Antidiabetic: Oral hypoglycaemics-possibility of hypoglycaemia in infant.
- ii. Antithyroid: Carbimazole; iodine: danger of hypothyroidism or goitre. Iodine is concentrated in milk. Propylthiouracil: monitor infant. Radioactive iodine-stop breast feeding on therapeutic doses; withhold for 24 hours after diagnostic doses.

- iii. Thyroid hormone: Liothyronine; thyroxine
- use with caution.
 - iv. Corticosteroids: Monitor carefully.
 - v. Sex Hormones: High doses of oestrogen and progestogens
suppress lactation.
 - vi. Bromocriptine: Suppress lactation.
9. Nutrition: Calciferol; thiamine; vitamin
A - caution.
10. Musculoskeletal System: Colchicine, gold. phenylbutazone -
use with caution.
Salicylates - caution.

Diseases of the liver

Drugs must be kept to the minimum in all patients with liver disease; if essential, they must be administered with caution. Hepatotoxicity of drugs may be dose related or idiosyncratic.

Drugs to be avoided or used with caution in liver disease
(examples)

1. Alimentary System

- i. Antacids: Avoid those which contain large amounts
of sodium, when there is fluid retention.
- ii. Antiulcer: Cimetidine can cause confusion states
occasionally.

2. Cardiovascular System

- i. Diuretics: Bumetanide, ethacrynic acid, frusemide, and
thiazides can cause hypokalaemia and precipitate coma.
- ii. Anti-dysrhythmics: Avoid or reduce lignocaine, and
verapamil.
- iii. Anti-hypertensives: Avoid methyldopa and sodium
nitroprusside.

3. Blood: Avoid oral anticoagulants.

4. Respiratory System

- i. Aminophylline Reduce dose
- ii. Antihistaminics: Avoid
- iii. Antitussives: Avoid those containing opiates.

5. Central Nervous System

- i. Hypnotics & Sedatives: All can participate coma.
- ii. Antipsychotics: Chlorpromazine is hepatotoxic.
- iii. Antidepressants: Monoamine oxidase inhibitors may cause idiosyncratic hepatotoxicity.
- iv. Drugs in nausea: Avoid antihistaminics and phenothiazines.
- v. Antimigraine: Avoid ergotamine
- vi. Antiepileptics: Phenobarbitone and primidone may precipitate coma. Reduce dose of phenytoin. Avoid sodium valproate.

6. Analgesics.

Ibuprofen and phenylbutazone increase risk of gastrointestinal bleeding and fluid retention.

Avoid aspirin, narcotics and large doses of paracetamol.

7. Anti-infective Drugs

Anti-bacterial: Avoid Chloramphenicol: Increased risk of bone marrow depression, Clindamycin-reduce the dose. Erythromycin can cause idiosyncratic hepatotoxicity.

Isoniazid-Idiosyncratic

Pyrazinamide-Avoid

Penicillins: caution

Rifampicin-Avoid or reduce dose

Tetracyclines-Avoid

8. Endocrine System

- 1) Antidiabetic: Metformin-Avoid. Sulphonylureas-Chlorpropamide and tolbutamide -Avoid.

- 2) Corticosteroids: Prednisolone-Side effects are seen.
Prednisolone is preferable to prednisone.
- 3) Sex hormones: Androgens and anabolic steroids-
methyltestosterone-Avoid.
- 4) Hypothalamic hormones: Avoid Clomiphene.

Diseases of the kidney

Toxicity can be produced by the inability of the kidney to excrete the drug or its metabolites. Some drugs are not effective in renal impairment. Nephrotoxic drugs must be avoided, as far as possible. The dose of the drug must be monitored individually to take care of the renal impairment (glomerular filtration rate). The serum creatinine concentration can be used as a rough guide.

Drugs to be avoided or used with caution in renal impairment (examples)

1. Alimentary System

- i. Antacids: Avoid those with high sodium content.
Avoid magnesium salts.
- ii. Antispasmodics: Avoid metaclopramide (extrapyramidal reactions).
- iii. Ulcer-healing drugs; Avoid Carbenoxolone. Reduce dose of cimetidine and ranitidine.
- iv. Antidiarrhoeals: Sulphasalazine-ensure high fluid intake.
- v. Laxatives: Avoid those with high sodium content.

2. Cardiovascular System

- i. Cardiac glycosides: Digitoxin and digoxin-reduce dosage.

- ii. Diuretics: Avoid amiloride, ethacrynic acid and thiazides. Bumetanide and frusemide may need high doses. Aldosterone and antagonists: monitor plasma K +
- iii. Antiarrhythmics: Disopyramide and procainamide- Avoid or reduce dose.
- iv. Beta-adrenoceptor blockers: Reduce dose.
- v. Antihypertensives: Guanethedine-Avoid. Captopril-reduce dose. Hydralazine, methyl dopa, prazosin: start with small dose. Sodium nitroprusside- avoid prolonged use.

3. Central Nervous System

- i. Hypnotics and sedatives-start with small doses.
- ii. Antipsychotics: Avoid lithium if possible.
- iii. Antimigraine: Avoid ergotamine
- iv. Anti-epileptics: Phenobarbitone, Primidone - Avoid large doses.
- v. Antiparkinsonism: Avoid amantadine.

4. Analgesics

Avoid ibuprofen, phenylbutazone, aspirin, narcotics and large doses of paracetamol.

5. Endocrine System

- i. Antidiabetics: Avoid metformin and sulphonylureas.
- ii. Antithyroid drugs: Propylthiouracil - reduce dose.

6. Anti-infective Drugs

i. Anti bacterial: Aminoglycosides-amikacin, gentamicin, kanamycin, netilmycin, streptomycin, tobramycin-reduce dose, Avoid neomycin. Antituberculous drugs: Ethambutol, isoniazid-reduce dose; cycloserine-avoid; Cephalosporins-reduce dose; avoid cephaloridine and cephalothin. Penicillins: Amoxycillin, ampicillin, carbenicillin-reduce dose. Benzylpenicillin - Max. 6 g. daily.

7. Urinary antimicrobial drugs: Avoid nalidixic acid, nitrofurantoin and chloramphenicol. Colistin-reduce dose. Cotrimoxazole-Max. 960 mg daily. Avoid lincomycin, sulphadiazine and tetracyclines; other sulphanamides - ensure high fluid intake. Trimethoprim - reduce dose. Vancomycin-avoid.

8. Antifungal: Amphotericin-avoid. Flucy-tosine-reduce dose. Anthelmintics: Piperazine - reduce dose.

9. Drugs used in rheumatic disease: Anti-inflammatory analgesics-see central nervous system. Chloroquine - reduce dose or avoid. Penicillamine -avoid.

10. Drugs used in gout: Allopurinol-reduce dose. Colchicine-avoid.

11. Eye: Acetazolamide-avoid

12. Anaesthetics: Neuromuscular blocking drug. Gallamine-avoid. Alcuronium, pancuronium, tubocurarine-reduce.

Rational use of drugs

Medicines have a potent role in the maintenance and restoration of health. They can be hazardous, if improperly used. Every drug carries with it a certain amount of risk.

There are over 60,000 formulations of drugs in India today. This compares with about 3,000 formulations in the Scandinavian countries. They restrict the number of formulations. In India, there is continuous flooding of the market with costly, hazardous and irrational drugs. It is estimated that over 20% of the drugs in the country are substandard or spurious.

Medicines should be prescribed and taken only when they are needed. This may sound too elementary but how often are medicines administered unnecessarily!

The benefit of administering the medicine should outweigh the risks involved.

The drug must be used in a rational way - dose, form, total duration.

We must have precise scientific information about the drugs we prescribe. The glossy leaflets often conceal information rather than reveal information. Sometimes the companies feed us with semiscientific data. So-called research is sometimes carried out with liberal payments by the firm. The results may be tutored and, when adverse, suppressed. We must ask for really scientific data. The manufacturers and their representatives must be asked to give us full information regarding the real indications, contra-indications, special precautions, side effects, adverse reactions, possible interactions and the dosage, together with cost for the entire treatment.

Understanding the mechanism of action helps in the rational use of drugs; eg., in pain : the non-steroidal anti-inflammatory agents produce their effects by inhibition of prostaglandin synthesis. The choice would then depend on the toxic side effects obtained from a combination of these agents; combinations often induce enhancement of the toxic effects. There is also no extra benefit by increasing the dose of the chosen drug above the optimum amount.

Often a non-steroidal anti-inflammatory agent is combined with an anti-spasmodic. The pain, if due to spasm of the hollow viscera, requires an antispasmodic like atropine or belladonna for relief; there is no role for the analgesic.

Cost: The cost does not reflect ^aquality. Many companies spend much more money on promotion of the drug than on quality assurance or research.

Non-drug therapies : Whenever possible, we should use acceptable non-drug therapies, eg., in cases of fever, tepid sponging or cold sponging may be sufficient and can do away with the drugs or reduce the dosage or frequency of administration of the antipyretics. Same procedure can be adopted for pain and other symptoms.

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How to choose a drug

From among the many tens of thousands of drug formulations it is necessary to choose the appropriate drugs. This will depend on many factors such as the morbidity pattern in the area and availability of the drug. There are certain principles in general, which must be kept in mind.

- (1) The drug must be indicated for the particular condition - preventive, curative or symptomatic relief.
- (2) It must be effective. The drug must be able to produce the intended effect, when administered in the right dose, form, route of administration, dose interval and duration of treatment, modifying favourably the clinical course. Ineffective drugs are not only useless; they can be positively harmful as they produce a false sense of security, allow resistance to develop, allow other organisms to grow or mask the signs and symptoms of the disease.
- (3) It must not be hazardous. There are drugs which have unacceptably high and unfavourable benefit/risk ratio. Safety, according to the purpose, is a very important criterion in the choice.
- (4) Its use must be rational, with a demonstrated clinical efficacy, for the defined situation. A drug which may be used in a male adult may be totally unwarranted in a pregnant person or a child or the elderly or in the presence of liver and kidney disease. Drugs of proven efficacy and safety individually, might be irrational when combined.
- (5) Product quality must be assured. This is done by good manufacturing processes and quality control at every stage by analyses and tests. We have far too many substandard and spurious drugs in the market. It is estimated that in our country, there are nearly 10,000 manufacturing units, large and small, most of them with inadequate quality control mechanisms. Just going by brand name or the manufacturer's name does not ensure quality.
- (6) The drug must be economical. When more than one drug of formulation, satisfying the various criteria are available, the cost-effective one must be chosen.
- (7) Full scientific information must be available.
- (8) The drug must be stable under ordinary conditions of storage and should have long shelf-life.

Fixed dose formulations

Fixed dose formulations of drugs have irresistible appeal. It is shotgun therapy, in the hope that one or more of the ingredients might be useful or they might have complementary or even synergistic effects. Such formulations which were popular seem to be on the way out, with more rational and discriminating prescribing. In Japan, very few of the new products are fixed ratio combinations; in India we still have a huge number of fixed dose combinations. The long list of these combinations shows

- (1) inability to critically diagnose and evaluate therapy
- (2) exploitation by the drug industry and
- (3) gullibility of the public, especially with respect to tonics, vitamins and nutritional formulations.

Advantages claimed for fixed - dose formulations :

- (1) Improved compliance in situations where more than one drug is to be taken, e.g., hypertension. Even here, there can be problems; beta-blocker in a hypertensive who is also an asthmatic.
- (2) Synergism; the best example being Co-trimoxazole. Recent studies question this. Some patients show hypersensitivity to the sulphonamide content. Trimethoprim, by itself, avoids this hypersensitivity and has shown greater efficacy in the treatment of ^{ur}inary tract infection.
- (3) Enhancement of therapeutic ^uefficacy, like decarboxylase inhibitors and levodopa in parkinsonism or ampicillin and probenecid in gonorr^rhoea.
- (4) Decrease in bacterial resistance as in multi-drug treatment of tuberculosis, but there are problems of inflexibility in fixed dose formulations.
- (5) Reduction in side effects as when pyridoxine is combined with isoniazid to prevent peripheral neuropathy.
- (6) Reduction in cost, in some cases.

Disadvantages are many :

- (1) Lack of flexibility in adjusting dosage. The effective dose of a drug varies from person to person and with the diseased state. Often the dose of the individual drug has to be adjusted - increased or decreased to obtain the optimum result.

- (2) The combinations are often irrational, e.g., benzodiazepines plus analgesics and anti-inflammatory steroids.
- (3) Very often, some of the components are unnecessary, e.g., fixed dose combinations of vitamins. The requirements of the vitamins should be determined for a particular deficiency.
- (4) The pharmacokinetics of the drugs may be incompatible. The biological half-lives of the components may be very different, affecting the availability and concentration of the drug.
- (5) Risk of interaction and toxicity. Such problems become more and more when the number of drugs in one preparation increases.
- (6) Ignorance of the true contents.
- (7) Many of the fixed dose formulations contain ingredients in quantities lower than therapeutically necessary, making them useless and even harmful.

The use of fixed-dose formulations is not justified in almost all situations and is better avoided for better patient care.

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Adverse drug reactions

Modern drugs can be highly beneficial if used with skill and wisdom but can lead to many serious adverse reactions. It is important to be aware of the possible side effects and to be on the look-out for adverse effects.

We often fail to take a drug history. The signs and symptoms presented by the patient may be due to the drugs taken by the patient and not due to any disease.

Most of the adverse reactions occur immediately or within a few days of administration; some can be delayed very much.

(This will be expanded)

Drug interactions

When more than one drug is administered, they may interact - potentiation, antagonism, different effect. The risk is greater the more the number of drugs.

The interaction may affect, absorption, binding, metabolism and excretion. The rate or amount of drug absorbed may be affected. Many drugs are bound to proteins to variable extent. One drug may displace another, increasing the amount of free drug. One drug may increase or decrease the metabolism in the liver and withdrawal will affect the concentration and toxicity. Drugs sharing the active transport systems in the kidney can affect the elimination of each other.

(This will be expanded)

1. DRUGS USED IN NAUSEA AND VERTIGO

Anti-emetics should be prescribed only when the cause of vomiting is known since symptomatic relief may delay diagnosis. The choice of anti-emetic depends on the etiology of vomiting. Hyoscine is the most effective drug for the prevention of motion sickness but because of its adverse effects (drowsiness, blurred vision, dry mouth and urinary retention), not tolerated as well as the anti histamines - Cyclizine, Cinnarazine, dimenhydrinate and promethazine. Of these, cyclizine and cinnarazine are less sedative. Drugs which act on the chemoreceptor trigger zone (metoclopramide and prochlorperazine) are ineffective in motion sickness. Vertigo and nausea associated with labyrinthine disorders can be prevented and treated by hyoscine, antihistamines and prochlorperazine. Betahistine and cinnarazine have been particularly useful in Meniere's disease.

Nausea in the first trimester of pregnancy rarely requires therapy. If hyperemesis occurs, an anti-histamine may be required though such use has not been conclusively proven to be safe in pregnancy.

The phenothiazine derivatives - Prochlorperazine and trifluoroperazine, in low dose, are drugs of choice in the prophylaxis of emesis associated with uremia, radiation, extensive cancer, opioid induced vomiting, general anaesthetics and cytotoxic drugs. Severe dystonic reactions have been known to occur especially in children.

Metoclopramide, in addition to its central effect also has a peripheral action on the gut and therefore may be superior to the phenothiazines in emesis associated with gastro-duodenal and

and hepato-biliary disease. Acute dystonic reactions, occur frequently. Domperidone has been used with good results in the prevention of cytotoxic drug induced emesis. It does not cross the blood-brain barrier and is therefore least likely to cause sedation or dystonias.

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CHAI--CMAI

Joint Hospital Formulary

1. ALIMENTARY SYSTEM

1.1 ANTACIDS & ANTIULCER DRUGS

1.1.1 ALUMINIUM AND MAGNESIUM

containing antacids with or without additional ingredients.

Indication: : Ulcer and non-ulcer dyspepsia;
reflux oesophagitis.

Preparation/Route/
Dose : Tab : 1-2
Suspension : 10-20 ml
in between meals and at
bed time.

S.P. & C.I.: : Magnesium containing antacids
tend to be laxative whereas
Aluminium containing antacids may
be constipating.
: Avoid taking at same time other
drugs as it may impair their
absorption.
: Avoid Magnesium containing
antacids in patients with
renal impairment.

Brands/Cost

ANTACID TABLET : Tab : 250mg;Rs 85.00 for 1000
(CMS-I)

GELUSIL MPS : Tab : Rs 1.41 for 10
(Warner)
Liquid : Rs 9.71 for 170 ml.

DIGENE (Boots)	:	Tab : Rs 1.05 for 8 Gel : Rs 7.77 for 210 ml
MUCAINE (Wyeth)	:	Gel : Rs 12.11 for 175ml
DIOVOL (Wallace)	:	Tab : Rs 6.10 for 50 Suspension : Rs 8.68 for 175ml
ZYMETS (Parke-Davis)	:	Tab:Rs 40 for 10 Liquid:Rs 7.50 for 170ml

1.1.2 Aluminium only preparation

ALUMINIUM HYDROXIDE

Indications: : Dyspepsia
As phosphate-binding agents in management of chronic renal failure.

Brand/Cost

ALUDROX (Wyeth)	:	Tab : Rs 6.70 for 50 Gel : Rs 7.32 for 350ml Dose : 1 tab or 15-30ml, 4 times a day.
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1.1.3 ANTACID MIXTURE

MAGNESIUM TRISILICATE MIXTURE

Mag. Trisiticate	5g
Light mag. carbonate	5g
Sod. bicarbonate	5g
Peppermint water to make	100ml

Dose: 15ml per dose

1.1.4 H₂- RECEPTOR BLOCKING DRUGS

CIMETIDINE

Indication

: Benign gastric and duodenal ulceration; stomal ulcer; reflux oesophagitis; Zollinger-Ellison syndrome; non-ulcer dyspepsia and other conditions where gastric acid reduction is beneficial.

As prophylactic to reduce frequency of upper G.I. bleeding in stress situations and as a prophylactic for acid aspiration.

Preparation/Route/ Dose

: Tab : 200mg; 400mg.

Dose : 400mg BD or 500 mg HS for healing of ulcer 4-8 weeks.

Maintenance - 400mg HS

Inj : Ampoule 100mg/ml

Dose : 200-400mg, IV. Q.8.h.

S.E.

: Gynaecomastia; rarely impotence. In elderly or very ill, may cause confusion.

Rarely acute pancreatitis, thrombocytopaenia and interstitial nephritis.

S.P.

: Caution in impaired renal and hepatic function, pregnancy and lactation.

Brands/CostTAGAMED
(Eskayef)Inj : 200mg/2ml: Rs 4.50
for 2ml amp.Tab : 200mg Rs 8.98 for 10
400mg Rs 17.95 for 10
800mg Rs 35.90 for 101.1.4.2 RANITIDINEIndication:

: as for Cimetidine

Preparation/Route/
Dose

: Tab : 150mg

Dose : 150mg BD 4-8 weeks

Maintenance: 150mg HS

Inj : Ampoule /25mg/ml

Dose : 50mg I.V. Q.8.h.

S.E., S.P. & C.I.

: As for Cimetidine

Does not have anti-androgenic
effects.Brands/CostZINETAC
(Glaxo)

: Tab : 150mg : Rs 19.00 for 10

300 mg :Rs 36.86 for 10

RANTAC
(Unique chem)

: Tab : 150mg : Rs 26.00 for 10

300mg : Rs 48.00 for 10

Inj : 50mg/2ml:Rs 2.84 for 2m

1.1.5 CHELATES & COMPLEXES1.1.5.1 SUCRALFATEIndication:

: Gastric and duodenal ulcers.

Preparation/Route/
Dose

: Tab : 1g.

Dose : 1 tab QID on empty
stomach, 1 hour before
each meal and at bed
time or 2g BD.

S.E.

: Constipation
Gastric discomfort

S.P./C.I.

: Avoid concomitant use of
antacid; may use $\frac{1}{2}$ hour
before or after.

S/P in impaired renal function.

Brands/Cost

ULCEKON
(FDC)

: Tab : 1g : Rs 13.68 for 10

GELFATE
(Micro Labs)

: Tab : 1g : Rs 21.00 for 10

1.2 ANTI EMETIC DRUGS

1.2.1 DOMPERIDOLIndication

: Nausea and vomiting.

Preparation/Route/
Dose

: Tab : 10mg

Suspension : 1mg per ml

Adults : 20-40mg, 3 times a day

S.E.

: Serum prolactin level may rise;
galactorrhoea; gynaecomastia

C.I.

: Pregnancy

Brand/CostDOMSTAL
(Torrent)Tab : Rs 9.50 for 10
Suspension: Rs 5.00 for 30 ml1.2.2 METOCLOPRAMIDEIndication: Adults : Nausea and vomiting
in G.I. disorders or during
chemotherapy and radiotherapy.
For radiological examination.
Patients under 20 years:
restrict use.Preparation/Route
Dose: Tab : 10 mg
Syrup : 5mg/5ml
Inj : 10mg/2ml amp.
Dose : Oral, IM or IV
5-10mg TID.
Child: 0.5-2.0mg/kg/day
individed doses. Q.6.h.
or Q.8.h.S.E.: Extra pyramidal signs and
symptoms, especially in children,
young adults and elderly;
tardive dyskinesia; acute
hypertensive response in
phaeochromocytoma.Caution: Renal impairment. Elderly,
children and young adults,
pregnancy. Avoid for 3-4 days
following G.I. surgery.

Brands/Cost

MAXERON
(Wallace)

Tab : 10mg: Rs 4.06 for 10
Liquid : 5mg/5ml: Rs 5.25 for 30ml
Inj : 10mg/2ml: Rs 2.00 per amp.

PERINORM
(IPCA)

Tab : 10mg: Rs 4.06 for 10
Liquid : 5mg/5ml: Rs 5.12 for 30ml
Inj : 5mg/ml: Rs 2.03 per 2ml amp.

REGLON
(CFL)

Inj : 5mg/ml: Rs 1.92 for 2ml amp.
Syrup : 5mg/5ml: Rs 5.04 for 30ml
Tab : 10mg : Rs 3.89 for 10

1.2.3 PROCHLORPERAZINEIndication

: Nausea; vomiting; vertigo;
labyrinthine disorders

Preparation/Route/
Dose

: Tab : 5mg
Inj : 10.5mg/ml
Dose : Adult 10-30mg daily
in divided doses
Injection: 12.5mg deep IM

S.E.

: Extrapyramidal symptoms

Brands/Cost

STEMETIL
(May & Baker)

: Inj : 12.5mg/ml: Rs 40.33 for
10 amp.
Syrup : Rs 11.02 for 50ml
Tab : 5mg : Rs 6.02 for 10
25mg: Rs 8.75 for 10

1.2.4 PROMETHAZINEIndication

: Nausea and vomiting;
labyrinthine disorders;
motion sickness; nausea
and vomiting of pregnancy.
Extrapyramidal side effects
of Metaclopramide.

Preparation/Route/
Dose

: See under 3.1.4

PHENERGAN
(M & B)

: Tab : 10mg : Rs 0.89 for 10
25mg : Rs 1.14 for 10
Inj : 2ml. amp. : Rs 11.70 for
Elixer : 5mg/5ml: Rs 6.92 for 125

1.3 ANTIHAEMORRHOIDAL DRUGS

1.3.1 LOCAL ANAESTHETIC,
ASTRINGENT and
ANTI-INFLAMMATORY DRUGSIndication

: Pain and bleeding associated
with haemorrhoids and anal
fissures.

Preparation/Route/
Dose

: Ointment
Suppository

Brands/Cost

ANOVATE
(Allenbury's)

: Ointment : Rs 6.50 for 15g.

PROCTOSEDYL
(Roussel)

: Ointment : Rs 12.45 for 10g.

1.4 ANTISPASMODIC DRUGS

1.4.1 ATROPINE SULPHATE

Indication

- : Reduce intestinal spasm in peptic ulcer, irritable bowel syndrome and diverticular disease.
- Reduce smooth muscle spasm.

Preparation/Route/Dose

- : Tab : 0.5mg
- Inj : 0.6mg/ml
- Dose : 0.25mg to 2mg daily in single or divided doses.
- Child: 0.01mg/kg

S.E.

- : Dry mouth; pupillary dilation with loss of accommodation; increased ocular pressure; bradycardia followed by tachycardia; flushing; dry skin; difficulty with micturition; constipation; rarely fever; rashes; confusional states.

C.I.

- : Glaucoma

S.P.

- : Elderly, urinary retention; prostatic enlargement; tachycardia; paralytic ileus; pyloric stenosis; ulcerative colitis.

Brand/Cost

ATROPINE
(Bengal Chem
& Pharm.)

- : Inj : 0.6mg/ml: Rs 38.19 for 50ml.

1.4.2 BELLADONNA ALKALOIDS

<u>Indication</u>	: Relief of smooth muscle spasm.
<u>S.E./S.P./C.I.</u>	: as under atropine sulphate.
<u>Brands/Cost</u>	
BELLADONNA (National Chemical)	: Tincture : Rs 18.60 for 450 ml
ATABBINE (UNI-UCA-UNICHEM)	: Belladonna 0.25mg, Hydroxyzine Hcl: 20mg Tab: Rs 2.31 for 12

1.4.3 DICYCLOMINE HYDROCHLORIDE

<u>Indication</u>	: Relief of smooth muscle spasm.
<u>Preparation/Route/ Dose</u>	: Dicylomine, 10mg Dimethyl polysiloxane 40mg
<u>S.E./S.P./C.I.</u>	: as under atropine sulphate
<u>Brand/Cost</u>	
COLIMEX (Wallace)	: Drops: Rs 6.19 for 10ml.

1.4.4 HYOSCINE BUTYL BROMIDE

<u>Indication</u>	: Relief of smooth muscle spasm.
<u>Preparation/Route/ Dose</u>	: Tab : 10mg Inj : 20mg/ml 1ml. amp.
<u>S.E./S.P./C.I.</u>	: as under atropine sulphate.
<u>Brand/Cost</u>	
BUSCOPAN (Boehringer-Ing)	: Tab : 10mg : Rs 124.78 for 200 Inj : 20mg/ml : Rs 42.60 for 20 amp.

1.5 LAXATIVES

1.5.1 ISPAGHULA HUSKIndication

: Bulk forming laxative.

Preparation/Route/
Dose

: Granules

2tsp. in water once or
twice daily.S.E.

: Flatulence, abdominal distension.

S.P.: Adequate fluid intake to be
maintained; ulcerative colitis.C.I.: Intestinal obstruction; colonicatory;
faecal impaction.Brand/CostISOGEL
(Allenbury's)

: Granules : Rs 18.54 for 100g.

1.5.2 BISACODYLIndication

: Stimulant laxative.

Preparation/Route/
Dose

: Tab : 5mg

Suppository : 10mg

Dose : 1-2 tabs HS

1 suppository

inserted rectally.

S.E.: Suppositories may cause local
irritation.

Tablets may cause griping.

S.P.

: Avoid prolonged use, as it can cause bowel atony and hypokalaemia.
Avoid in children.

Brand/Cost

DULCOLAX
(German Remedies)

: Tab : 5mg: Rs 30.00 for 100
Suppository: 10mg: Rs 9.40 for 5
5mg: Rs 7.60 for 5

1.5.3 DIOCTYL SODIUM SULPHOSUCCINATE
(Docusate Sodium)

Indication

: Stimulant laxative and stool softener.

Preparation/Route/Dose

: Capsules 100mg
Dose: Adult: 100mg BD or TID
Child: 5mg/kg body weight daily

S.P.

: Avoid prolonged use.

Brand/Cost

CELLUBRIL
(Astra-IDL)

: Capsules: 100mg: Rs 11.56 for 30

1.5.4 PARAFFIN

Indication

: Stool softener

Preparation/Route/Dose

: Liquid paraffin.

S.E.

: Avoid prolonged use.
May cause anal irritation.
Lipoid pneumonia.
Interference with absorption of fat soluble vitamins.

S.P. : Avoid combination with
phenolphthalein
(Rashes, albumin uria,
haemoglobinuria)

Brand/Cost

CREMAFFIN : Liquid: Rs 13.38 for 210ml.
(Boots)

1.5.5. GLYCERINE

Indication : Relieve constipation.

Preparation/Route/
Dose : Glycerine suppository

Cost : Adult suppository: Rs 18.50 for 100
Paediatric suppository: Rs 17.60 for 100

1.6 DIARRHOEA--DRUGS USED IN.

1.6.1 REPLACEMENT SOLUTION

1.6.2 ANTI DIARRHOEAL (Symptomatic Drugs)

1.6.2.1 PECTIN-KAOLIN MIXTURE

Preparation/Route/
Dose : Mixture: Pectin 120mg }
Light Kaolin 2g } 10 ml
Dose: 10-20ml 3-4 times a day

Brand/Cost

LINOPEL : Suspension: Rs 6.55 for 110ml.
(TTK)

1.6.2.2 LOPERAMIDE HYDROCHLORIDE

<u>Indication</u>	: Acute diarrhoea in adults and children over 4 years. Chronic diarrhoea.
<u>Preparation/Route/Dose</u>	: Tab : 2mg Dose : 2 tabs initially and 1 tab after each loose stool - max. of 8/day Child: 0.05mg/kg/day in divided doses.
<u>S.P./C.I.</u>	: Occasional rashes children below 2 years.
<u>Brand/Cost</u>	
LOPAMIDE (Torrent)	: Tab : 2mg: Rs 3.00 for 10

1.6.2.3 ORAL REHYDRATION SALTS

<u>Indication</u>	: Rehydration therapy in all cases of diarrhoea and dysentery and maintenance of hydration.		
<u>Preparation/Route/Dose</u>	: (W.H.O.) solution		
Sodium Chloride	: 3.5 g.	Na	: 90 m Eq/L
Potassium Chloride	: 1.5 g.	K	: 20 "
Sodium citrate dihydrate	: 2.9 g	Cl	: 80 "
Glucose (anhydrous)	: 20.0 g	Glucose	: 111 "
Instead of citrate, sodium bicarbonate (2.5g) can be used; glycine and citrate based formula can also be used.			

Packets to be made and dissolved in one litre of clear drinking water before use.

Dose: Give as much as the child drinks--usually between 100-200ml/kg/day (atleast 200ml after every loose stool)

Important: Mother must be taught how to frequently administer the solution using a cup or spoon.

Should be started early in diarrhoea.

Nutrition to be maintained.

S.P.

: Infants weighing less than 6kg and those below 6/12 of age: use ORS alternately with breast milk or boiled cooled water.

In neonates use ORS with less sodium.

Renal or hepatic insufficiency, hyperbilirubinaemia.

C.I.

: Severe dehydration, shock, peripheral circulatory failure, coma, convulsions, severe vomiting, glucose malabsorption; paralytic ileus; premature infants.

S.E.

: overhydration; peri-orbital oedema;

hypernatremia (especially in babies less than 6 kg, if given alone).

Brand/Cost

ORS (W.H.O.)

Alternate with breast feed or water.

1.7 MISCELLANEOUS

1.7.1 LACTOBACILLUS

Indication : Imbalanced intestinal flora due to antibiotics and chemotherapy.
Hepatic encephalopathy.

Preparation/Route/Dose : Capsule
1 capsule TID.

Brands/Cost

VIZYLAC : Capsule : Rs 7.89 for 12
(Unichem)

LACTISYN : Oral : Rs 18.00 for 6 amps.
(Franco India)

1.7.2 NEOMYCIN

Indication : Hepatic encephalopathy
Bowel sterilisation pre-operative.

Details : See 6.3.4.3

1.7.3 MIST CARMINATIVE (See 6.3.2.3)

1.7.4 PREDNISOLONE RETENTION ENEMA

Indication : Ulcerative colitis.

Preparation/Route/
Dose : 20mg Prednisolone in
100ml aqueous solution.
Dose: 1 enema at bed time
for 2-4 weeks;
then reduced.

S.E./S.P./C.I : As under Hydrocortisone

1.7.5 SULPHASALAZINE (SALAZOPYRIN)

Indication : Ulcerative colitis.

S.E./S.P./C.I. : As under 6.3.2.3

1.7.6 VASOPRESSIN

Indication : Bleeding from oesophageal
varices. Pituitary diabetes
insipidus.

Preparation/Route/
Dose : Inj : 20 units/ml--1ml amp.
Diabetes insipidus 5-20 units
S.C. or IM Q.4.h.

Bleeding oesophageal varices:
Method of administration--
By I.V. infusion:
1) 20 units/100ml of
distilled water given
over 15 minutes.

2) 100 units in 250ml of distilled water resulting in 0.4 unit of Vasopressin/ml, given by a peripheral vein by either one of the following schedules:

a) 0.3 unit/minute for 12 hours
0.2 unit/minute for next 24 hours and finally 0.1 unit/minute for additional 24 hours.

or

b) 0.3 unit/minute for at least 30 minutes and if ineffective progressively increase the dose at 30-60 minutes intervals up to 0.9 unit/minute for a maximum of 2-4 hours tri period.

S.E.

: Pallor, nausea, belching, cramps, desire to defaecate; hypersensitivity reaction; constriction of coronary arteries (Angina; myocardial ischaemia).

S.P.

: Heart failure, asthma, epilepsy, migraine.

Adjust fluid intake to avoid hyponatraemia and water intoxication.

C.I.

: Vascular disease, chronic nephritis (until reasonable blood nitrogen concentration attained)

Subcutaneous infiltration can cause ischaemia and gangrene of the digits.

Brand/Cost

PITRESSIN
(Parke Davis)

: Amp. 20 units: Rs 477.90 for 10 amp.

1.7.7 SCLEROTHERAPY DRUGS

1.7.7.1 SODIUM TETRADECYL SULPHATE
(STD)Indication

: Oesophageal varices.

Preparation/Route/
Dose

: as per specific instructions.

1.7.7.2 SODIUM MORRHUATEIndication

: Oesophageal varices.

Preparation/Route/
Dose

: as per specific instructions.

2. DRUGS USED IN ANAESTHESIA

General Anaesthetics: The present trend in anaesthesia is to administer several drugs with different actions to produce a state of surgical anaesthesia with minimal risk of toxic effects. An intravenous agent is frequently used for induction, followed by maintenance with inhaled anaesthetics, perhaps supplemented by other drugs administered intravenously. Specific drugs are often used to produce muscle relaxation.

Intravenous anaesthetics may also be used alone to produce anaesthesia for short surgical procedures but are more commonly used for induction only. These are potent drugs which nearly all produce their effect in one arm-brain circulation time and can cause apnoea and hypotension and so adequate facilities for resuscitation must be available. Large doses should be avoided in obstetrics, as the drug may cross placental barrier. The drugs are contraindicated if the airway cannot be maintained due to obstructive lesions of larynx and pharynx. Extreme care is required in surgeries of mouth, pharynx and larynx and in patients with congestive cardiac failure and fixed cardiac output. For tracheal intubation, induction should be followed by inhalational anaesthesia or by a neuro muscular blocking drug. Thiopentone is the most widely used intravenous anaesthetic, but has no analgesic property. Induction is smooth and rapid. Ketamine can be given intravenously or intra muscularly and has good analgesic properties when used in subanaesthetic dosage. It is widely used as an inducing agent and for maintenance of anaesthesia in children during short procedures like cardiac catheterization and bronchoscopy. The main disadvantage is the high incidence of hallucinations and

transient psychotic sequelae. It is contra-indicated in hypertension and in mental illness.

Inhalational anaesthetics may be gasses e.g., Cyclopropane and nitrous oxide, or volatile liquids e.g., Halothane, ether, and enflurane. They can be used for both induction and maintenance of anaesthesia and may be used following induction with an intravenous agent. Gaseous agents require suitable equipment for storage and administration. It is necessary to monitor flow rate. Volatile agents are usually administered with air, oxygen or nitrous oxide-oxygen mixtures as the carrier gas using calibrated vaporisers. A mixture of nitrous oxide and oxygen is used for induction and maintenance of anaesthesia. Halothane is the most widely used of the volatile agents. Muscle relaxation produced by halothane is inadequate for major abdominal surgeries and specific muscle relaxants should be used. It is hepatotoxic. Cyclopropane forms explosive mixtures with air and oxygen and hence it should be used in a closed circuit system. Adrenaline infiltration should be avoided because of danger of dysrhythmias. Diethyl ether is a potent anaesthetic agent, but is less popular now because the vapour forms flammable and explosive mixtures with oxygen. However it is still used in small set ups because administration is simple and has a wide margin of safety.

LOCAL ANAESTHETICS

Local anaesthetic drugs act by causing a reversible block to conduction along nerve fibres. In estimating the safe dosage of these drugs, it is important to take into account - the rate at which they are absorbed and excreted, their potency, the patient's age, weight, physique, clinical condition, the degree of vascularity of the area to which the drug is to be applied and the duration of administration. Toxic effects are due to high plasma concentration, and these include excitation of the central nervous system followed by depression. Hypersensitivity reactions are more common with cocaine, benzocaine, procaine and amethocaine. Local anaesthetics should not be applied or injected into/infected or infected tissues because of the risk of rapid absorption and systemic toxicity. Adrenaline, a vasoconstrictor, is added to local anaesthetics to prolong their effect in a concentration of 1/200,000. It should not be used in digits and appendages because of the risk of gangrene, or in patients on tricyclic anti-depressants because of the potentiation of cardiotoxicity.

Lignocaine is the most widely used local anaesthetic. Duration of block with adrenaline lasts for about one and half hours. Adrenaline should not be used with cocaine since it has a vasoconstrictive effect. Amethocaine is a topical anaesthetic agent.

Lignocaine and Bupivacaine can be used for spinal and epidural anaesthesia. These give good muscle relaxation and allow use of cautery. However, they are not suitable for surgery above the diaphragm.

2. ANAESTHETICS

2.1 GENERAL ANAESTHETICS AND OXYGEN

2.1.1 ETHER

<u>Indication</u>	: General anaesthetic
<u>Route/Dosage</u>	: Inhalation. Bottles 500ml Induction--10-15% Maintenance--3-5%
<u>S.E.</u>	: Irritant, stormy induction and recovery.
<u>Caution</u>	: Inflammable.
<u>C.I.</u>	: Diabetes Mellitus; renal and hepatic dysfunction.

2.1.2 HALOTHANE

<u>Indication</u>	: Induction and maintenance of anaesthesia in major surgery, with oxygen and nitrous oxide--oxygen mixtures.
<u>Route/Dosage</u>	: Inhalation Induction up to 5% Maintenance 0.5 to 1%
<u>S.E.</u>	: Hepatotoxicity. Cardiorespiratory depression
<u>C.I.</u>	: Hepatic dysfunction
<u>Brand/Cost</u>	
FLUOTHANE (IEL)	: 50ml : Rs 65.00 250ml : Rs 299.00

2.1.3 NITROUS OXIDEIndication

: Induction and maintenance of anaesthesia; analgesia in subanaesthetic doses.

Route/Dosage

: Inhalation

Using a suitable anaesthetic apparatus a mixture with 20-30% oxygen for induction and maintenance of light anaesthesia.

Analgesic - as a mixture with 50% oxygen

S.E.

: Prolonged exposure may cause megaloblastic anaemia and depression of white cell formation.

2.1.4 OXYGENIndication

: Along with anaesthetic agents.

See Respiratory System.

2.1.5 KETAMINE

Indication

: Induction and maintenance of anaesthesia.

Route/Dosage

: Inj : 10mg/ml & 50mg/ml in 10ml vials.

Dose: 2mg/Kg I.V.; 10mg/Kg I.M.

S.E.

- : Tachycardia
- Transient psychotic sequelae.

C.I.

- : Severe hypertension;
- cardiovascular accidents;
- increased intracranial tension;
- increased intra-ocular tension.

Brand/Cost

KETMIN
(Themis)

- : 2ml amps: Rs 12.50
- 10ml vial: Rs 51.00

2.1.6

THIOPENTALIndication

- : Induction of general anaesthesia;
- anaesthesia of short duration.

Route/Dosage

- : Powder for injection
- 0.5g sodium salt in ampoule
- Dose: 100-500mg I.V.

S.E.

- : Sedation

C.I.

- : Respiratory obstruction;
- status asthmaticus; severe shock;
- porphyria; Addison's disease;
- uncompensated heart failure.

Brand/Cost

PENTOTHAL
(Abbot)

- : 0.5g vial; Rs 9.01
- 1.0g vial; Rs 15.68

INTRAVAL
(M & B)

- : 0.5g - 50 amps: Rs 450.50
- 1.0g - 50 amps: Rs 554.00

2.1.7

DIAZEPAMIndication

: Sedative for surgical procedures.

S.E.

: Drowsiness, dizziness, ataxia, confusion, respiratory depression, hypersensitivity reaction, pain, thrombophlebitis with IV infusion.

S.P./C.I.

: Respiratory depression; hypersensitivity reaction.

Brands/costVALIUM
(Roche)

: 6 amps: Rs 13.32

CALMPOSE
(Ranbaxy)

: 10 amps: Rs 21.44

2.2 LOCAL ANAESTHETICS

2.2.1

BUPIVACAINEIndication

: Local infiltration; nerve block; epidural block.

Route/Dosage: Inj : 1% amp (2ml)
0.5% vial (10ml)

Dose: adjusted according to the block. Injection up to 2mg/kg in any 4 hr period. Spinal anaesthesia: 10-20mg adjusted according to site of operation.

S.E./S.P./C.I. : As under LIGNOCAINE
(See below 2.2.2)

Brand/Cost

MARCAIN : 2ml amp: Rs 2.00
(Sarabhai)

2.2.2 LIGNOCAINE

Indication

: Infiltration; nerve blocks;
epidural and caudal block.

Route/Dosage

: Inj : 1%, 2% in vial of 30ml
2% with adrenaline:
vial of 30ml
5% for spinal anaesthesia:
2ml amp.

Topical forms: Jelly - 2%
Ointment - 5%
Viscous - 2%

S.E. : Hypotension; bradycardia; cardiac
arrest; agitation; euphoria;
convulsion; respiratory depression.

S.P. : Epilepsy; hepatic dysfunction;
bradycardia; elderly

C.I. : Myasthenia gravis; complete
heart block; hypovolemia.

Brand/Cost

XYLOCAINE : Inj : 1% 30ml vial : Rs 3.50
(Astra-IDL) 2% 30ml vial : Rs 3.75
2% with adrenaline:
30ml vial : Rs 3.80
5% 2ml amp : Rs 31.36

Jelly : 2% 30g : Rs 4.50
 Viscous : 2% 100ml : Rs 6.40
 Ointment : 5% 10g : Rs 3.25
 35g : Rs 6.75

2.2.3 PROCAINE HCl

Indication

: Infiltration or regional anaesthesia

Route/Dosage

: Inj : 2% solution

Dose : adjusted according to site of operation and response of patient to a maximum of 1g (200ml of 0.5% solution or 100ml of 1%) with adrenaline 1 in 200,000.

S.E./S.P./C.I.

: As for Lignocaine

Brand/Cost

PROCAINE HCl
 (Marks, India)

: Rs 5.00 for 30ml

3. ANALGESICS

These are used for pain relief. The main groups represented here are the non opioid analgesics and opioid analgesics.

Analgesic requirements is profoundly influenced by attitude of both the patient and the prescriber to pain.

NON-OPIOID ANALGESICS: These analgesics are mainly intended for relief of mild to moderate pain especially for musculo skeletal conditions - e.g., Aspirin, Paracetamol, Brufen etc.

ASPIRIN is the analgesic of choice for headache treatment of musculoskeletal joint pain, dysmenorrhoea. It has in addition anti inflammatory and antipyretic action. Aspirin in various forms is adequate for most purposes because of their speedy action and low cost. Aspirin in small doses is also used as an antiplatelet drug in myocardial infarction. Major problem is gastric irritation that can be minimised by taking it with food. The buffered aspirin and other formulations are mainly to improve gastric tolerance. Contraindicated in children below 12 years and in breast feeding (for fear of Reye's syndrome), gastro-intestinal ulceration, haemophilia and with concurrent anticoagulant therapy.

PARACETAMOL is equiefficient as aspirin but has no anti inflammatory action. The gastric irritant effects are also less. Paracetamol overdose has the danger of causing hepatic necrosis which may not be evident for 4 - 6 days. It is indicated for mild to moderate pain and in pyrexia. It should be used with caution in hepatic impairment, alcoholism.

Drug interactions with metoclopramide resulting in potentiation of effect occurs.

Naproxen, Ibuprofen etc. These are used for mild to moderate pain, pyrexia and are best given after food.

PIROXICAM is well absorbed orally with a long half life of 38 - 45 hours and hence can be administered once again. Doses of 10 - 20 mg. are analgesic antipyretic where as higher doses are needed for anti inflammatory effect. It also has gastric irritant effects and is used in rheumatoid and osteo arthritis.

The non-opioid analgesics are also called non steroidal anti inflammatory drugs. In single doses they are comparable to paracetamol as analgesic and full doses have analgesic and anti-inflammatory effect. Their use is hence in

rheumatoid and osteoarthritis. In general these should be used with caution in the elderly, in peptic ulceration, pregnancy, renal and liver damage. Drug interaction with anticoagulants occur.

1. NSAIDs should not be given to patients with active peptic ulceration.
2. In patients with a history of peptic ulcer disease and in the elderly they should be given only after other forms of treatment have been carefully considered.
3. In all patients it is prudent to start at the bottom end of the dose range

Any degree of worsening of asthma may be related to the ingestion of NSAIDs, either prescribed or (in the case of ibuprofen) purchased over the counter.

SIDE EFFECTS: Side effects are variable in severity and frequency, Gastro-intestinal discomfort, nausea, diarrhoea and occasionally bleeding occur and may be minimised by advising that these drugs should always be taken with food or milk. Hypersensitivity reactions (particularly angioedema, asthma, and rashes), headache, dizziness, vertigo and hearing disturbances such as tinnitus. Blood disorders have occurred. Fluid retention may occur (rarely precipitating congestive heart failure in elderly patients). Rarely, reversible acute renal failure may be provoked by NSAIDs especially in patients with pre existing renal impairment; papillary necrosis or interstitial fibrosis, associated with NSAIDs may also lead to chronic renal failure.

CHOICE OF DRUG: Differences in anti-inflammatory activity between different NSAIDs are small, but there is considerable variation in individual patient response. About 60% of patients will respond to any NSAID. Among the rest, those who do not respond to one may well respond to another. Therefore it is often necessary to try several drugs before finding one to suit a particular patient. Most NSAIDs should produce an effect within a few days. If used for analgesia alone they should be changed if no response is obtained after a week; if an anti-inflammatory action is also required, they should be changed if no response is obtained after three weeks.

The main differences between NSAIDs are in the incidence and type of side effects. Before treatment is started the prescriber should weigh efficacy against possible side effects for each drug.

OPIOID ANALGESICS

They are used for relief of moderate to severe pain. These are narcotic analgesics of varying degree of dependance and tolerance especially when used repeatedly. However this is no deterrent to its use in the control of pain in terminal illness.

These drugs should be used with caution in patients with a history of drug abuse, decreased resp^{iratory} reserve, hypothyroidism, asthma, hepatic and renal impairment and during pregnancy and lactation. ^{Their} use should be avoided in patients with raised intracranial tension or head injury as ~~it~~ ^{they} will interfere with respiration, pupillary responses etc. which are vital for clinical assessment. Dose should be modified in presence of renal damage. Dosage should be reduced also in the elderly and debilitated patients.

SIDE EFFECTS: In common, all of them cause constipation, resp^{iratory} depression, cough suppression, urinary retention, nausea and tolerance and dependance of the narcotic analgesics. ~~Morphine still remains the most valuable narcotic analgesic.~~

Of this group, morphine ^aremains the most valuable opioid analgesic for severe pain. Buprenorphine is suitable for sublingual or parenteral use, ~~but~~ ^{it} ~~like pentazocine~~ has both opioid agonist and antagonist properties and may precipitate withdrawal symptoms. It has a longer duration of action than morphine (8 - 12 hours). Dependance potential is low and opioid effects are only partially reversed by naloxone but doxaprim is an effective antidote. Pentazocine is weaker than morphine and has agonist and antagonist properties. ~~It~~ ^{and} should be used with caution in patients already on opioid analgesics as it can precipitate withdraw^al symptoms.

Codeine though an opioid analgesic has predominant cough suppressant effect and it is used for this purpose mainly and for the constipating action.

3. ANALGESICS, ANTIPYRETICS and NON-STEROIDAL ANTIINFLAMMATORY DRUGS

3.1 NON-OPIOIDS

3.1.1 ACETYLSALICYLIC ACID

Indication : Mild to moderate pain; pyrexia.

Route/Dosage : Tablet - 300mg
Dose : 300-900mg. Q 4-6 hours
max: 4G/day

S.E. : Gastro-intestinal irritation;
bronchospasm and skin reactions
in hypersensitive patients.

C.I. : Children under 12 years:
Reyes Syndrome. Peptic ulcer
disease; haemophilia;
concurrent anti-coagulant
therapy.

S.P. : Bronchial asthma; pregnancy;
renal and hepatic dysfunction.

Brand/Cost

ASPIRIN
(Haffkine) : 300mg tab : Rs 7.00 for 100
Rs 56.25 for 1000

ASABUF
(Wallace) : 350mg tab : Rs 2.70 for 10

DISPRIN
(RCI) : 350mg tab : Rs 2.19 for 12

3.1.2

IBUPROFENIndication

: Mild to moderate pain

Preparation/Route/
Dose

: Tablet : 200mg; 400mg; 600mg

Suspension: 100mg/5ml

Dose: 400mg TID after food
initially200mg TID after food
maintenancePaediatric: 20mg/kg/day
in 3 divided doses.S.E.: Gastro-intestinal discomfort;
hypersensitivity reactions;
headache; dizziness; vertigo;
pruritis; fluid retention.C.I.: Active peptic ulcer disease.
Hypersensitivity.S.P.

: Pregnancy

Brand/CostIBUPROFEN
(CMS-I): Tab : 200mg : Rs 215.00 for 1000
400mg : Rs 365.00 for 1000BRUFEN
(Boots): Tab : 200mg : Rs 5.09 for 10
400mg : Rs 9.41 for 10
600mg : Rs 11.11 for 10IBUGESIC
(Cipla): Tab : 200mg : Rs 5.06 for 10
400mg : Rs 9.36 for 10
600mg : Rs 17.21 for 10NUGIN
(Glindia): Tab : 200mg : Rs 4.89 for 10
400mg : Rs 9.04 for 10

3.1.3

INDOMETHACINIndication

: Pain with moderate to severe inflammation in rheumatic disease and other musculoskeletal disorders; acute gout.

Preparation

: Caps: 25mg
75mg (Retard)

S.E.

: Headache, dizziness, ulceration and gastro-intestinal bleeding; drowsiness, confusion, depression, syncope; thrombocytopenia, hypertension; hyperglycaemia; blurred vision; corneal deposits; peripheral neuropathy.

S.P.

: Lactation; epilepsy; psychiatric disturbances; hypertension; renal diseases.

Brand/Cost

IDICIN
(IDPL)

: Caps : 25mg : Rs 23.16 for 10x10 ca

INMECIN
(Sterfil Labs)

: Caps : 25mg : Rs 3.84 for 10 caps
50mg : Rs 6.06 for 10 caps

3.1.4

PARACETAMOLIndication

: Mild to moderate pain; pyrexia

Route/Dosage

: Tab : 500mg, Syrup
Inj : 300mg/2ml amp.
120mg/5ml

Dose: Adult: 1-2 tab 3-4 times daily

Children: 1-3 years:
 $\frac{1}{2}$ tsp per dose

3-7 years: 1-2
 tsp per dose

7-12 years: 2
 tsp per dose

S.E.

: Liver damage on prolonged use or over dosage.

S.P.

: Hepatic dysfunction.

C.I.

: Hypersensitivity to paracetamol.

Brand/Cost

PARACETAMOL
 (CMS-I)

: Tab : 500mg : Rs 95.00 for 1000

CALPOL
 (B.W.)

: Tab : 500mg : Rs 2.05 for 10

Suspension: 120mg/5ml : Rs 4.68
 for 60ml

CROCIN
 (Duphar)

: Tab : 500mg : Rs 2.05 for 10

Syrup: 125mg/5ml : Rs 5.14 for 60ml

3.1.6

KETOPROFEN

Indication

: Pain and mild inflammation in rheumatic disease and other musculoskeletal disorders; dysmenorrhoea.

Route/Dosage

: Caps : 50mg & 100mg

Dose : 50-100mg BD

S.E./C.I. : As for Ibuprofen

Brand/Cost

ORUDIS : Caps : 50mg : Rs 8.65 for 10
(PCI)

OSTOFEN : Caps : 50mg : Rs 9.00 for 10
(Torrent)

3.1.7

NAPROXEN

Indication : Pain and inflammation in
rheumatic disease and other
musculoskeletal disorders;
acute gout.

Route/Dose : Tab : 250mg
Dose : 250mg BD

S.E./C.I. : As for Ibuprofen

Brand/Cost

NAPROSYN : Tab : 250mg : Rs 22.82 for 10
(Searle)

NAXID : Tab : 250mg : Rs 18.22 for 10
(Cipla)

ANTISVEL : Tab : 250mg : Rs 21.79 for 10
(Martel Hammer)

3.1.8

PIROXICAM

Indication : Pain and inflammation in
rheumatic disease and other
musculoskeletal disorders;
acute gout.

Route/Dose

: Caps : 10mg & 20mg

Dose : Initially 20mg O.D.
after food

Maintenance: 10mg-20mg O.D

S.E./C.I.

: As for Ibuprofen

Brand/CostPIROX
(Cipla): Caps : 10mg : Rs 11.30 for 10
20mg : Rs 16.90 for 10BREXIC
(Wockhardt): Caps : 10mg : Rs 4.50 for 6
20mg : Rs 7.20 for 6

3.2 OPIOID ANALGESICS

3.2.1 CODEINEIndication

: Mild to moderate pain.

Route/Dose

: Tab : 30mg (Phosphate)

Dose : 10-60mg every 6 hours
up to max. 200mg/dayS.E.: Tolerance and dependance;
sedation; dizziness;
nausea; constipation.S.P.: As for OPIOID analgesics.
Avoid in children below 1 yearBrand/CostCODEINE PHOSPHATE
(Belco Pharma)

: Tab : 30mg : Rs 126.00 for 1000

3.2.2

MORPHINEIndication

: Severe pain; acute pulmonary oedema

Route/Dose

: Inj : 15mg/ml ampoule
 Dose : IM or S.C. 8-15mg (adult)
 Child: 0.1mg/kg
 Adult I.V. 2mg/mt up to
 10mg-15mg

S.E./C.I.

: As for OPIOID analgesics

Brand/Cost

MORPHINE
 (Alembic)

: 15mg per ml : Rs 37.04 for 10 amp.

3.2.3

PETHIDINEIndication

: Moderate to severe pain;
 obstetric analgesia.

Route/Dose

: Inj : 50mg/ml - 2ml ampoule
 Dose : Adult: IM - 25-100mg
 IV - 25-50mg
 Child: 1mg/kg

S.E./C.I.

: As for OPIOID analgesics

Brand/Cost

PETHIDINE
 (Alembic)

: 50mg per ml. 2ml amp: Rs 37.50 per
 10 amp.

3.2.4 PENTAZOCINEIndication

: Moderate to severe pain

Route/Dose

: Tab : 25mg

Inj : 30mg per ml

Dose: IM 30-60mg

IV 30mg

Oral: 1-4 Tablets

}	may be
	repeated
	Q.6.h.

S.E./C.I.

: As for OPIOID analgesics

Brand/CostFORTWIN
(Ranbaxy): Inj : 30mg per ml: Rs 39.89
for 10 amps.

Tab : 25mg : Rs 12.55 for 10

Inj : 30mg per ml: Rs 4.13

3.2.5 BUPRENORPHINEIndication

: Moderate to severe pain

Route/Dose

: Tab : 0.2mg sublingual. Q.6-8.h

Inj : 0.3mg - 0.6mg IM or IV

(May be repeated Q.6.h)

S.E./C.I.

: As for OPIOID analgesics.

Brand/Cost
^G
TAMESIC
(Dadha Pharma)

: Tab: Rs. 13.00 for 10.

4. ANTI-ALLERGICS

Antihistaminics: All antihistaminics are of potential value in the management of nasal allergies such as vasomotor rhinitis, and hay fever. Their usefulness is in relieving nasal congestion, reducing rhinnorrhoea and sneezing.

Oral antihistaminics are of some value in preventing urticaria and are used to treat allergic rashes, pruritus and insect bites and stings and in drug allergies. Chlorpheniramine and promethazine injections are used as adjuncts to adrenaline injection in emergency treatment of angioedema and anaphylaxis. They are also useful in travel sickness.

There is no evidence that any one antihistamine is superior to another and patients vary widely in their response to them. The differences are only in terms of duration of action and incidence of side effects. Most antihistaminics are short acting except promethazine which is active for upto 12 hours. All produce sedation of varying extent. Astemizole is reported to be least sedative and produce minimal psychomotor disturbance due to poor penetration of blood brain barrier.

They interact with other drugs - alcohol, barbiturate and benzodiazepines potentiate their effect. Serious disadvantage is that they may cause drowsiness that can interfere with driving or operating a machinery.

Anticholinergic effects like urinary retention, dry mouth, blurred vision, paradoxical stimulation etc. can occur. They should be used with caution in epilepsy, prostatic hypertrophy glaucoma or hepatic disease.

4. ANTIALLERGISCS

4.1 ANTIHISTAMINES/DECONGESTANTS/EXPECTORANTS

4.1.1 CHLORPHENIRAMINE MALAETEIndication : CoughRoute/Dose : Tab : 4mg
Adult: 4mg 3-4 times/day
Child: 0.35mg/kg/24 hrs in
4 doses.S.E. : Drowsiness; headache; urinary
retention; blurred vision;
gastro-intestinal disturbance.S.P. : Epilepsy; prostatic hypertrophy;
glaucoma; hepatic disease.Brand/CostPIRITON : Rs 10.63 for 500
(Glindia)4.1.2 CYPROHEPTADINE HClIndication : Allergy; pruritis.Route/Dose : Tab : 4mg; Syrup: 2mg/5ml
Adult: 1 tab BD or TID
Child: 0.2mg/kg/day in 2-3
divided doses.S.E./C.I. : As for Antihistamines.

Brand/CostPRACTIN
(Merind): Tab : Rs 3.08 for 10
Elixir: 2mg per 5 ml: Rs 11.30
per 100ml

4.1.3

DIPHENHYDRAMINEIndication

: Allergic conditions

Route/Dose: Caps : 25mg Kapseal : 50mg
Syrup: 12.5mg/5ml
Expectorant: 14mg/5ml

Dose : 1 cap or Kap 3-4 times/day

Syrup: 10-25ml 3-4 times/day
(Adult)5-10ml 3-4 times/day
(children)

Expectorant: Adults: 5-10ml, 2-3 hrs

Child: 2-5ml, every 3 h

S.E./C.I.

: As for Antihistamines.

Brand/CostBENADRYL
(Parke Davis & Co): Caps : 25mg : Rs 2.41 per 25
Expectorant: Rs 6.36 for 114 ml
Syrup : Rs 6.08 for 114ml

4.1.4

PROMETHAZINE HClIndication

: Allergy; nausea.

Route/Dose: Tab : 10mg & 25mg
Inj : 25mg/ml - 2ml amp.
Syrup: 5mg/5ml

Dose: 25mg at night

Inj: 25mg deep IM

Syrup: children: 0.5mg/kg/dose

S.E./C.I.

: As for Antihistamines

Brand/Cost

PHENERGAN
(M&B)

: Elixir : 5mg per 5ml:

Rs 6.92 per 120ml

Inj : 2.5% 2ml amp: Rs 11.70
for 10 amps.

Tab : 10mg: Rs 0.89 for 10

25mg: Rs 1.14 for 10

4.1.5

PHENIRAMINE MALAETE

Indication

: Allergy; allergic dermatitis;
insect bite.

Route/Dose

: Tab : 25mg

Inj : 22.5mg/ml 2ml

Expectorant : 15mg/5ml

Dose: Adult : 1 tab BD or TID

Inj : 1-2ml BD IM or slow IV

Syrup & Expectorant: 7.5-10ml
2-4 times/day

Child: 0.35mg/kg

S.E./C.I.

: As for Antihistamines

Brand/Cost

AVIL
(Hoechst)

: Inj : 22.5mg per 2ml: Rs 11.01 per
10ml vial

Syrup: 15mg per 5ml: Rs 4.12 per
100ml

Expectorant: Rs 6.59 per 10ml

45

4.1.6

TRIPROLIDINE HClIndication

: Allergy

Route/Dose: Tab : triprolidine HCl 2.5mg
Pseudoephedrine 60mg

Dose: Adult: 1 tab BD or TID

Child 2-12 years: $\frac{1}{2}$ tab BD or TID

Syrup: Triprolidine HCl 2.5mg/5ml

Ephedrine HCl - 15mg/5ml

Dose: Child 2-5 years: 1.25ml BD

5-10 years: 2.5ml BD

above 10 years: 2.5ml TID

S.E./C.I.

: As for Antihistamines

Brand/CostACTIFED
(B.W.)

: Tab : Rs 3.11 for 10

ACTIDIL
(B.W.): Elixir: 2mg per 5 ml
30ml Rs 2.04

4.1.7

^B
MEHYDROLIN NAPADISYLATEIndication

: Allergic conditions

Route/Dose

: Tab : 50mg base

Dose: Adult : 2-5 tab daily in
3-4 divided doses.Child: 5-10 years: 2-4 tabs
in 3-4 divided doses
2-5 years: 1-3 tab in
3-4 divided doses.S.E./C.I.

: As for Antihistamines.

Brand/Cost

INCIDAL
(Bayer)

: Tab : Rs 16.19 for 100

4.1.8

ASTEMIZOLEIndication

: Allergic rhinitis; allergic conjunctivitis.

Preparation/Route/
Dose

: Tab : 10mg
Suspension: 1mg/ml

S.P./C.I.

: Pregnancy

Brand/Cost

ASTELONG
(Torrent)

: Rs 12.00 for 10 tabs
Rs 9.90 for 60ml

4.2 CORTICOSTEROIDS

4.2.1

BETAMETHASONEIndication

: Severe asthma; hay fever; allergic skin disorders.

Route/Dose

: Tab : 0.5mg
Inj : 4mg/ml - 2ml amp.

S.E./C.I.

: As for CORTICOSTEROIDS

Brand/Cost

BETNELAN
(Glindia)

: Tab : Rs 2.06 for 10

BETNESOL
(Glindia) : Inj : Rs 14.67 for 3 amps.

CELESTONE
(Fulford) : Tab : Rs 3.88 per 10

4.2.2 DEXAMETHASONE

Indication : Allergic conditions

Route/Dose : Tab : 0.5 mg
Inj : 4mg/ml, 2ml vials

S.E./C.I. : As for CORTICOSTEROIDS

Brand/Cost

DECADRON
(Merind) : Tab : Rs 2.22 for 10

WYMESONE
(Wyeth) : Tab : Rs 2.47 for 10
Inj : 2ml vial : Rs 6.62

4.2.3 HYDROCORTISONE SODIUM SUCCINATE

Indication : Allergic and anaphylactic conditions.

Route/Dose : Inj : 100mg/2ml; IM or slow IV.
Dose: Adult: 100-500mg 3-4 times/day
or as required
Child: upto 1 year: 25mg
1-5 years: 50mg
6-12 years: 100mg

S.E./C.I. : As for CORTICOSTEROIDS

Brand/CostEFCORLIN SOLUBLE
(Glindia)

: Inj : 13.45 per vial

LYCORTIN
(Lyka)

: Inj : 100mg vial : Rs 11.11

4.2.4

PREDNISOLONEIndication

: Allergic conditions

Route/Dose

: Tab : 5 mg

S.E./C.I.

: As for CORTICOSTEROIDS

Brand/CostWYSOLONE
(Wyeth): Tab : 5mg : Rs 3.09 for 10
10mg : Rs 5.95 for 10DELTA CORTIL
(Pfizer)

: Tab : Rs 2.70

4.3 OTHER DRUGS USED IN ALLERGIC STATES

4.3.1

ADRENALINERoute/Dose

: Inj : (1:1000) : 1ml amp.

Dose: Adult: 0.2-0.5ml S/C or IM

Child: 0.01ml/kg

S.E.: Palpitation; sweating; tremor;
hypertensionC.I.: Hypertension; myocardial
disease; cardiac asthma;
hyperthyroidism.

S.P.

: Dangerous in status
asthmaticus.

Avoid in infants and
the very old.

Brand/Cost

ADRENALINE
(Bengal Chem
& Pharma)

: Inj. : 1 in 1000: Rs 60.44
per 50 amps.

5. POISONING

The mainstay of successful treatment in poisoning is proper identification of the agent ingested, the dose taken, and a knowledge of the drug's pharmacology and toxic effects. Supportive therapy, however, should not be delayed while awaiting identification.

First aid measures in poisoning include prevention of drug absorption and enhancement of elimination. Gastric lavage and forced emesis with syrup of ipecacuanha effectively remove the poison from the stomach. However, these measures are of doubtful value if attempted more than 4 hours after ingestion except in cases of agents which delay gastric emptying (eg., salicylates and anti-depressants). Gastric lavage and forced emesis is contraindicated in poisoning with corrosives and petroleum distillates. Comatose patients should have a cuffed endo-tracheal tube inserted prior to lavage, to prevent aspiration of gastric contents. Activated charcoal effectively adsorbs most drugs and hence reduces their absorption if given 1 - 2 hours after ingestion of the poison. It should not be given along with an anti-dote since it will bind the anti-dote. In case of organophosphorus poisoning (via. insecticide sprays) all clothes should be removed and the skin thoroughly washed.

Repeated doses of activated charcoal also enhance elimination of certain drugs such as aspirin, carbamazepine, digoxin, barbiturates, phenytoin, quinine and theophylline. Other techniques of poison elimination are forced alkaline diuresis (salicylates and phenobarbitone), hemodialysis (salicylates, phenobarbitone, methyl alcohol, ethylene glycol and lithium), and charcoal hemoperfusion (medium and short acting barbiturates, chloral hydrate and meprobamate).

Intensive supportive care should be instituted along with the above. A clear airway should be established and maintained. Intubation should be performed in any patient with respiratory insufficiency, loss of consciousness, impaired or absent gag reflex or status epilepticus. Supplemental oxygen and assisted ventilation should be provided as indicated clinically or with the help of arterial blood gases. Pulmonary edema due to toxic endothelial damage or volume overload should be treated.

Hypotension usually responds to volume expansion with normal saline and correction of hypoxia and acidosis. Dopamine is the vasopressor of choice in refractory hypotension but should be used carefully in overdoses with tricyclic anti-depressant or phenothiazine overdose. Hypertension is uncommon but can occur with sympathomimetic overdoses in which case Propranolol, sodium nitroprusside, sodium diazoxide are useful agents.

CNS depression is a common feature of overdose with sedative-hypnotics and narcotics. Naloxone is used as a diagnostic agent or to reverse depressant effects of narcotics. Administration of 50% dextrose and thiamine is mandatory in any patient with depressed level of consciousness. Hemoperfusion or hemodialysis is generally indicated in managing comatose patients with circulatory or respiratory failure. Repetitive seizures require treatment with diazepam.

Certain drugs (e.g. salicylates, methanol, ethylene glycol) may cause a metabolic acidosis which if significant ($\text{pH} < 7.2$) should be corrected with I.V. sodium bicarbonate.

Antidotes are indicated for specific poisoning as a diagnostic maneuver and to reverse or protect against life threatening drug effects.

5. ANTIDOTES AND OTHER SUBSTANCES USED IN POISONING.

5.1 GENERAL

5.1.1 CHARCOAL, Activated

Indication

: Binding of poisons,
reducing absorption.

Route/Dose

: Powder
Dose: 25g every 2 hours
or
50g every 4 hours.

5.1.2 IPECACUANHA

Indication

: Induction of vomiting.

Route/Dose

: Syrup : 14mg/10ml
Ipecacuanha alkaloid
as emetine
Dose: Adult 30ml; may be repeated
after 20 minutes.
Child: 6-18 months: 10ml
Older children: 15ml

5.1.3 MAGNESIUM SULPHATE

Route/Dose

: Powder 10-30g
Dose: Adult: 5-15g with 100-200ml
water
Child: 100-250mg/kg
Mixture: 4g/10ml
Adult: 10-20ml with water
Child: 5-10ml

S.P.

: Hepatic impairment.

5.2 SPECIFIC

5.2.1 ATROPINE SULPHATEIndication

: Organophosphorus poisoning

Route/Dose

: Inj : 0.6mg/ml

Dose; 0.3-2mg S.C., IM

Massive doses IV in organophosphorus poisoning up to 50-100mg in 24 hours.

S.E.

: Dry mouth; dilatation of pupil; increased intraocular pressure; difficulty with micturition; constipation; arrhythmias.

C.I.

: Glaucoma

S.P.

: Elderly; urinary retention; prostatic enlargement; tachycardia; paralytic ileus; ulcerative colitis; pyloric stenosis.

Bengal Chem & Pharma

: Inj : Rs 38.19 for 50 amps.

5.2.2 DEFERRIOXAMINEIndication

: Removal of iron from the body in poisoning.

Route/Dose

: Inj : 500mg in vial

Dosage & adm.: see literature

S.E./C.I.

: See literature

Brand/Cost

DESFERAL
(Hindustan
CIBA GEIGY)

: Inj : Rs 157.85 for 5 amps.

5.2.3 DIMERCAPROLIndication

: Poisoning by antimony, arsenic,
bismuth, gold, mercury, thallium,
adjunct in lead poisoning.

Route/Preparation/
Dose

: Inj. in oil: 50mg/ml,
2ml amp, deep IM.

Dose: Adult: 100mg every 4 hours
for 48 hours, then
100mg TID for 8-10 days.

In Wilson's disease: 300mg
daily for 10 days
every 2nd month for
long periods.

Child: 4mg/kg every 4 hours
initially, later
2.5mg/kg.

S.E.

: Nausea; vomiting; headache;
burning in eyes, mouth;
lacrimation; muscle pain;
angina; drug fever.

S.P.

: Hepatic damage; hypertension

C.I.

: Iron & lead poisoning.

Brand/Cost

BAL
(Boots)

: Inj : amp. Rs 14.65

5.2.4

NALOXONE HClIndication

: Overdosage with opioids

Route/Preparation/
Dose: Inj : 0.02mg/ml ampoule
0.4mg/ml vials.Dose: 0.4--0.8mg I.V.,
repeat after 20-30 min.
- max. 10mgNeonates 0.01mg/kg/dose
repeat 15-30 minutes if
necessary.C.I.

: Liver disease

Brand/CostNARCAN
(Du Pont): Not currently available
in India.

5.2.5

NEOSTIGMINEIndication: Reversal of non-depolarising
block; reversal of residual
paralysis produced by muscle
relaxants; antagonise neuro-
muscular blocking drugs.
Anticholinesterase agent.Route/Preparation/
Dose

: Tab : 15mg

Inj : 0.5mg/ml

Dose: Adult: 12-30mg every 4-6 h
orally; 0.25-1mg IMChild: Orally 0.25mg/kg/dose
IM 0.025-0.045mg/
kg/dose

S.E.

: Salivation; bronchospasm;
diarrhoea; intestinal colic;
miosis; tachycardia;
cholinergic crisis.

Brand/Cost

PROSTIGMIN
(Roche)

: Inj : Rs 22.18 for 50 amps.

5.2.6

PRALIDOXIMEIndication

: Adjunct to atropine in the
treatment of organophosphorus
poisoning.

Route/Preparation/
Dose

: Inj : 0.5g powder in vial

Dose : Adult: 1g IV at a rate not
exceeding 500mg/min. or
dilute in 250ml of saline
and infuse over 30 minutes.

Child: 25-40mg/kg as a 5%
solution; up to 60mg/kg
in severe cases.

S.E.

: Drowsiness; giddiness; tachycardia;
- blurred vision; hypotension;
neuromuscular blockade with
higher doses.

C.I.

: Hepatic failure.

Brand/Cost

P₂AM
(Unichem)

: Inj : Rs 99.50 for 2 amps.

5.2.7

PENICILLAMINEIndication

: Copper or lead poisoning;
Wilson's disease; rheumatoid
arthritis.

Route/Preparation/
Dose

: Cap : 250mg of base
Dose : 0.9 - 1.8G daily in
4 doses (Max 4G/day)
Infants over 6 months:
20mg/kg/day.
Older children: 1G/day
in 4 doses.

S.E.

: Headache; fever, rash; loss
of taste, lymphadenopathy;
agranulocytosis; thrombocytopenia;
nephrotic syndrome; proteinuria;
allergic reactions similar to
penicillin.

S.P.

: During treatment regular blood
counts and urine examination
required.

C.I.

: Renal and hepatic failure.
S.L.E.

Brand/Cost

DISTAMINE
(Dista)

6. ANTIINFECTIVES

ANTHELMINTHICS

The commonest parasitic infection in India is hook worm which is a major cause for iron deficiency anaemia. Bephenium was widely used as it has least side effects and is effective against round worms. Mebendazole is more popular because of the broader spectrum of activity. Thiabendazole also with a wider spectrum of activity especially against strongyloides is used. But this has greater side effects than Mebendazole.

For thread worm infection, the drugs effective are Mebendazole which as a single dose of 100 mg is the drug of choice.

Other drugs like Piperazine and Pyrantel are equally effective. Mebendazole may also be used. The use of Mebendazole is cautioned during pregnancy.

For round worm infection, Levamisole is considered very effective but expensive. Mebendazole, Pyrantel and Piperazine may be given.

For tape worm infection drugs are generally very effective and repeated treatments are necessary. Niclosamide, Praziquantel and Albendazole are considered effective. Praziquantel is also effective in Schistosomiasis.

6. ANTI-INFECTIVE DRUGS

~~ANTIBACTERIALS~~ ~~ANTIBIOTICS~~ ANTI-BACTERIALS

Before starting an antibiotic, patient factors such as history of allergy, severity of illness, age, pregnancy, liver and renal function and other concomitantly given drugs should be considered. Equally important is to consider the nature of the organism and its antibiotic sensitivity. It is important to remember that most upper respiratory infections are of viral origin and viral infections should not be treated with antibiotics. The antibiogram of local pathogens is of great help. Dose adjustments would be required for very young, very old and those with renal impairment or very severe infection.

PROPHYLACTIC use of antibiotics is recommended only in a few situations. They are [^]prevention of recurrence of rheumatic fever, (penicillin), prevention of secondary cases of meningococcal meningitis (Rifampicin), prevention of secondary case of diph^htheria in non-immune patient (Erythromycin), prevention of bacterial endocarditis in patients with heart valve lesions, (pencillin), prevention of gas gangrene in high lower limb amputation or following major trauma (Penicillin), prevention of tuberculosis in susceptible close contacts (Isoniazid), prevention of infection in abdominal surgery - gastric, oesophage carcinoma, cholecys^ttomy (gentamicin or cephaloⁿsporin), Resections of colon, rectum (gentamicin and metronidazole) and ^hystrectomy (metronidazole).

Curative use

1. Gastrointestinal

For bacillary dysent^ery and gastro-enteritis, antibiotics are generally not indicated. But in severe shigella dysent^ery, ⁿalidixic acid is useful. For enteritis due to campylobacter, erythromycin and ^for giardiasis, metronidazole are useful.

Typhoid fever - chloramphenicol, cotrimoxazole or ampicillin or amoxycillin

Biliary infections - gentamicin or cephalosporin

Peritonitis - gentamicin and metronidazole

Whenever anaerobic infections are suspected, metronidazole should be used.

2. For pneumonias depending on the organism, ~~either~~ chloramphenicol, ampicillin or cotrimoxazole ~~is to be used~~.

3. For meningitis with meningococci, pneumococci or H. influenza - penicillin or chloramphenicol respectively can be given.

4. S.T.D Syphilis and gonorrhoea respond to penicillin and ^{to} those [^] sensitive to penicillin, ~~can be given~~ erythromycin ~~can be given~~.

5. Urinary tract

^A Acute pyelonephritis or prostatitis ~~with~~ cotrimoxazole or trimethoprim or gentamicin or cephalosporin

Lower U.T.I. - trimethoprim, ampicillin or nitrofurantoin or oral cephalosporins

6. E.N.T. infection

Tonsillitis - penicillins, or erythromycin

Otitis media - penicillins or amoxycillin or erythromycin

Sinusitis - erythromycin or cotrimoxazole

7. Dermatological

Impetigo - topical chlortetracycline or penicillins

Cellulitis - penicillin

Acne - tetracyclines

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ANTITUBERCULOUS DRUGS

Many drug regimes are practised. The National Programme can be followed where possible. But it is important to remember that combination of at least 3 drugs should be used to delay resistance.

The primary drugs used for the initial phase are Rifampicin, INaH, Pyrizanamide, Ethambutol and Streptomycin in varying combination. During the continuation phase, two drug combination is used. The choice of drugs, duration of treatment etc. vary with the intensity of disease, cost factors, drug resistance, prior therapy etc. For respiratory disease regardless of its extent it is generally believed that combination of Rifampicin and Isoniazid daily for 9 months is sufficient. Where meningeal involvement is present, Pyrizanamide is added. It is important to look for hepatotoxic effects as both INaH and Rifampicin and Pyrizanamide are hepatotoxic. Similarly in patients on Ethambutol, periodic visual examination should be done.

Failure of therapy in most cases is either due to poor patient compliance or inappropriate dosage regimes. Hence special care should be taken to see that adequate treatment for adequate periods is given.

ANTIAMOEBIIC DRUGS

METRONIDAZOLE is the drug of choice for acute amoebic dysentery as it is effective against the vegetative amoebae at a dosage of 800 mg¹ thrice daily for 5 days. It is also effective in amoebic hepatitis and in other extra-intestinal amoebiasis when the treatment course is 400 mg¹ thrice daily for 10 days. ~~It is ineffective in intestinal amoebiasis as it has~~ no effect on cyst.

DILOXANIDE FUROATE is the drug of choice for chronic infections in which only cyst forms are present. The usual duration of course is 10 days and is devoid of serious side effects.

TINIDAZOLE is an equally effective amoebicide like metronidazole. Emetine though effective produces many marked side effects and is now largely replaced by metronidazole.

CHLOROQUINE is used mainly for hepatic amoebiasis in doses of 600 mg¹ daily for 5 days followed by 300 mg¹ daily for 14 - 21 days. It is slower in action and less effective than metronidazole.

6-4-3

ANTIMALARIALS

CHLOROQUINE is the drug of choice for the treatment of benign malaria. For clinical cure or suppression of symptoms chloroquine 600 mgm initially followed by a single dose of 300 mgm after 6 - 8 hours and followed by 300 mgm daily for two days will suffice.

Though chloroquine alone is sufficient for falciparum malaria, in the treatment of benign tertian malaria caused by P.vivax additional treatment with primaquine is required for radical cure to destroy parasites in liver. Primaquine is given as 15 mg daily for 14 - 21 days.

A number of falciparum malaria patients are resistant to chloroquine. For these quinine tablets 600 mgm thrice a day for 7 days are given with a single dose of 300 mgm 3 tablets of Fansidar.

CHEMOPROPHYLAXIS: It is important to remember prophylaxis is relative and not absolute. Prophylaxis should be started one week prior to and continued during stay in endemic area and upto 4 weeks after. 200 mgm of proguanil daily with chloroquine 300 mgm one weekly is recommended.

National Programme

"Text book of Social and Preventive Medicine", Park & Park to be referred for National Programmes on Malaria, Leprosy, Tuberculosis and Filariasis.

6. ANTI-INFECTIVE DRUGS

6.1 ANTIHELMINTHICS

6.1.1 ALBENDAZOLE

Indication

: Round worms, hook worms, thread worms, whip worms, pin worms and tape worms.

Route/Preparation/ Dose

: Tab : 200mg
Suspension: 200mg/5ml
Dose: Adults & children
single dose of 400mg.

C.I.

: Pregnancy

S.P.

: Hepatic or renal dysfunction.

Brand/Cost

ALBENDOL
(Micro Lab)

: Tab : Rs 4.00 for 2
Suspension: Rs 6.60 for 10ml

ZENTEL
(Eskayef)

: Tab : Rs 5.70 for 2
Suspension: Rs 7.80 for 10ml

6.1.2 MEBENDAZOLE

Indication

: Thread worm, round worm, hook worm, whip worm, pin worm, mixed infections, tape worm.

Route/Preparation/ Dose

: Tab : 100mg
Syrup : 100mg/5ml
Dose: 1 tab or 5ml, RD x 3 days

S.E. : Abdominal pain; diarrhoea.
S.P. : Pregnancy
C.I. : Children below 2 years.

Brand/Cost

MEBENDAZOLE : Tab : 100mg : Rs 96.00 for 600 tabs.
 (CMS-I)
 MEBEX : Granules : Rs 2.20 for 5g sachets
 (Cipla)
 PANTELMIN : Tab : Rs 7.14 for 6
 (Ethnor) Suspension: 10mg per 5ml:
 Rs 12.02 for 30ml

6.1.3 NICLOSAMIDE

Indication : Taenia saginata; T. solium;
 Diphyllbothrium latum;
 Hymenolepis nana.

Route/Preparation/
Dose

: Tab : 500mg
 Adult: After a light breakfast
 2g as a single dose or
 2 divided doses one hour apart.
 To be thoroughly chewed and
 swallowed with little water.
 Followed by a purgative after
 2 hours.
 Child above 8 years : $\frac{1}{2}$ adult dose.
 (Use an antiemetic early
 morning on day of treatment.)

S.E. : Gastro-intestinal discomfort;
 pruritis; light headedness.

Brand/Cost

NICLOSAN : Tab : Rs 8.30 for 4
 (Biddle Sawyer)

6.1.4

PRAZIQUANTELIndication

: Schistosomes (haematobium, mansoni and japonicum).

Route/Preparation/Dose

: Tab : 600mg
10-20mg/kg, single dose

Brand/Cost

BILTRICIDE

: Not currently available.

6.1.5

PYRANTELIndication

: Round worm, thread worm and hook worm.

Route/Preparation/Dose

: Tab : 250mg
Suspension: 50mg/ml
Dose: 10mg/kg - max. 1g as a single dose.
Hookworm - as above for 3 consecutive days.

S.P.

: Liver disease; pregnancy.

Brand/Cost

NUMANTEL
(Searle)

: Tab : 250mg : Rs 5.20 for 3
Suspension: 250mg/5ml: Rs 5.20 for 10ml

COMBANTRIN
(Pfizer)

: Tab : 200mg: Rs 3.69 for 2
Suspension: 25mg/ml: Rs 4.34 for 8 ml.

6.2 ANTIAMOEBIAC

6.2.1 DILOXANIDE FUROATEIndication

: Acute, subacute and chronic intestinal amoebiasis.

Route/Preparation/Dose

: Tab : 500mg

Dose: Adult 500mg TID for 10 days

Child: 20mg/kg/24 hours in 3 doses for 10 days

(Luminal amoebicide of choice)

S.E.

: Flatulence; vomiting; urticaria; pruritis.

Brand/CostFURAMIDE
(Boots)

: Tab : Rs 5.70 for 10

ENTAMIZOLE-FORTE
(Boots--
Diloxanide 250+
Metronidazole 400g)

: Tab : Rs 10.10 for 15

Syrup : Rs 16.09 for 75ml

6.2.2 METRONIDAZOLEIndication: Amoebic dysentery,
intestinal amoebiasis,
giardiasis.Route/Preparation/Dose

: Tab : 200mg & 400mg

Syrup: 100mg/5ml

Inj : 5mg/ml--100ml

Dose: Adult: 400-800mg TID
for 5-10 daysChild: 35-50mg/kg/24 hrs
for 10 days.S.E.

DK 400

: Gastro-intestinal
disturbances (take after food);
drowsiness; headache;COMMUNITY HEALTH CELL
326, V Main, I Block
Koramangala
Bangalore-560034

peripheral neuropathy.

S.P.

: Pregnancy; lactation.

Brand/Cost

METRONIDAZOLE
(CMS-I)

: Tab : 200mg: Rs 170.00 for 1000
400mg: Rs 282.00 for 1000

FLAGYL
(May & Baker)

: Inj : Rs 12.80 for 100ml
Flagyl paediatric: 200mg/5ml:
Rs 8.88 per 30ml
Tab : 200mg: Rs 3.09 for 10
400mg: Rs 5.26 for 10

METROGYL
(Unique)

: Tab : 200mg: Rs 2.99 for 10
400mg: Rs 5.10 for 10

6.2.3

TINIDAZOLE

Indication

: As for metronidazole

Route/Preparation/
Dose

: Tab : 300mg
Dose: 600mg BD x 5 days
Child: 50mg/kg, single dose

S.E./S.P.

: As for Metronidazole

Brand/Cost

TINI
(Kopran)

: Tab : 300mg: Rs 72.75 for 100
500mg: Rs 120.00 for 100

TRIDAZOLE
(Franco Indian)

: Tab : 300mg: Rs 7.01 for 10

6.2.4 DEHYDROEMETINEIndication

: Amoebiasis; schistosomiasis.

Route/Preparation/
Dose

: Tab : 100mg

Dose: 10-20mg tid., for 6-10 days;
if required 15 days.

Inj : 30mg/ml

Dose: 1mg/kg body weight daily
for 6-10 days.C.I.

: Severe organic disease; pregnancy

S.P.: Treatment should not be started
less than 45 days after a
previous course of emetine.Brand/CostDEHYDROEMETINE
(Roche)

: Tab : Rs 6.56 for 10

Inj : 30mg: Rs 3.48 for 1 ml
60mg: Rs 6.01 for 2ml

6.3 ANTIBACTERIAL DRUGS

6.3.1 PENICILLINS

6.3.1.1 BENZYL & PHENOXYMETHYL PENICILLIN

6.3.1.1.1 BENZYL PENCILLIN
(Penicillin G)Indication: Pneumococal, streptococcal,
staphylococcal and meningococcal
infections, venereal diseases
(gonorrhoea and syphilis),
actinomycosis, anthrax, diphtheria

tetanus and gas gangrene.
 Penicillin prophylaxis in
 rheumatic fever and dental
 procedures.

Route/Preparation/
Dose

: Inj : 500,000 U/ml
 1,000,000 U/ml
 I.M. or I.V.
 Dose: Varies with disease
 type and severity.

S.E.

: Hypersensitivity.

S.P.

: Avoid intrathecal administration.
 High dose may lead to accumulation
 of electrolytes (Na or K)

Brand/Cost

LONGACILLIN
 (Hindustan
 Antibiotics)

: Inj: 600,000 U : Rs 2.69 for 1 vial.
 1,200,000 U : Rs 4.66 for 1 vial
 2,400,000 U : Rs 8.43 for 1 vial

BENZYL PENICILLIN
 (Alembic)

: Inj: 500,000 U : Rs 3.22 for 1 vial
 1,000,000 U : Rs 4.62 for 1 vial

6.3.1.1.2 PROCAINE PENICILLIN

Indication

: Syphilis, gonorrhoea, gas gangrene
 following amputation.

Preparation/Route/
Dose

: Inj : 400,000 U/vial
 2,000,000 U/vial
 500,000 to 1,000,000 U IM daily
 (Not for I.V. use)

S.E.

: Hypersensitivity.

S.P.: Avoid intrathecal administration
High dose may lead to
accumulation of electrolytes
(Na or K)Brand/Cost

PROCAINE PENICILLIN : 400,000 U vial : Rs 2.05
(IDPL) 2,000,000 U vial: Rs 5.21

6.3.1.1.3

BENZATHINE PENICILLINIndication: Penicillin-sensitive infections;
prophylaxisRoute/Preparation/
Dose: Inj: 600,000 U per vial
1,200,000 U per vial
2,400,000 U per vialBrand/CostPENIDURE
(Wyeth)

: LA 6, 12, 24.

Cost : LA 6 : Rs 2.50 per vial
LA 12 : Rs 4.00 per vial
LA 24 : Rs 7.00 per vial

6.3.1.1.4

PHENOXYMETHYL PENICILLIN
(Penicillin V)Indication: Respiratory tract infections
in children, streptococcal
tonsillitis; continuing
treatment after one or more
injection of benzyl penicillin,
when clinical response has begun.

It should not be used for meningococcal or gonococcal infections. Can be used for prophylaxis against streptococcal infections following rheumatic fever.

Route/Preparation/
Dose

: Tab : 250mg
Syrup: 125mg/5ml (2,000,000 U/5ml)
Dose: Adult: 125-250mg every 4 hours
Child: 15-30mg/kg/24 hours in 4 doses.

S.P./C.I.

: As for BENZYL PENCILLIN

Brand/Cost

CRYSTAPEN
(Glindia)

: Tab : 400,000 U : Rs 5.42 for 6

CRYSTAPEN V
(Glindia)

: Granules for syrup: 125mg/5ml:
Rs 9.55 for 32.5g

6.3.1.2 PENICILLINASE RESISTANT PENCILLIN

6.3.1.2.1 CLOXACILLIN

Indication

: Staphylococcal infections producing penicillinase; mixed infections.

Route/Preparation/
Dose

: Caps : 250mg & 500mg
Syrup : 125mg/5ml of constituted syrup
Inj : 250mg & 500mg/vial
Dose: 250-500mg/kg in divided doses.

S.P./C.I.

: As for PENICILLIN

Brand/CostKLOX
(Lyka)

: Inj : 250mg vial: Rs 5.22

500mg vial: Rs 7.10

Caps : 250mg : Rs 17.82 for 12

500mg : Rs 34.18 for 12

Syrup: 125mg/5g: Rs 10.24 for 24g

6.3.1.3 BROAD SPECTRUM PENICILLINS

6.3.1.3.1

AMPICILLINDIIndication: Urinary tract infections,
otitis media, chronic bronchitis,
invasive salmonellosis,
gonorrhoea.Route/Preparation/
Dose

: Cap : 250mg & 500mg

Syrup: 125mg/5ml of constituted
syrup

Inj : 250mg & 500mg/vial

Dose: 250-500mg/kv in divided doses

S.P./C.I.

: As for BENZYL PENICILLIN;

Erythematous rash in glandular
fever and chronic lymphatic
leukaemia.

: Reduce dose in renal impairment.

Brand/CostAMPICILLIN
(CMS-I)

: Caps : 250mg : Rs 420.00 for 500

AMPILIN
(Lyka)

: Caps : 250mg: Rs 6.40 for 4;
500mg: Rs 21.37 for 8
Inj : 100mg: Rs 4.25 per vial;
250mg; Rs 5.40 per vial;
500mg: Rs 7.48 per vial
Syrup: 125mg/5ml: Rs 8.32 for 40ml
250mg/5ml: Rs 13.55 for 40ml

ROSCILLIN
(Ranbaxy)

: Caps : 250mg: Rs 18.19 for 10
500mg: Rs 34.12 for 10
Inj : 250mg : Rs 4.51 vial
+ diluent;
500mg : Rs 7.60 vial
+ diluent
Suspension: 125mg/5ml: Rs 10.81
for 40ml;
250mg/5ml : Rs 16.88 for
40ml.

ALBERCILLIN
(Hoechst)

: Caps : 250mg: Rs 6.97 for 4
500mg: Rs 12.96 for 4
Drops: 100mg/ml: Rs 8.34 for 10ml
Syrup: 125mg/5ml: Rs 9.06 for 40ml
Inj : 250mg vial: Rs 4.51
500mg vial: Rs 5.90

6.3.1.3.2

BACAMPICLLIN

Indication

: As for Ampicillin

Route/Preparation/
Dose

: Tab : 400mg
Dose: 400mg, 2-3 times daily

S.P./C.I.

: As for BENZYL PENICILLIN.

Brand/Cost

PENGLOBE
(Astra-IDL)

: Tab : Rs 12.77 for 4

6.3.1.3.3

AMOXYCILLINIndication

: As for ampicillin;
also typhoid fever and
dental prophylaxis.

Route/Preparation/
Dose

: Caps : 250mg & 500mg
Syrup: 125mg/5ml
Dose: 250-500mg every 8 hours
Child: 40mg/kg in 3 divided
doses.

S.P./C.I.

: As for BENZYL PENICILLIN

Brand/Cost

AMOXIPEN
(PCI)

: Caps : 250mg: Rs 21.26 for 12
500mg: Rs 19.04 for 6
Syrup: 125mg/5ml:Rs 6.75 for 30

MOX
(Gufic)

: Caps : 250mg: Rs 6.20 for 3
500mg: Rs 10.92 for 3
Syrup: 125mg/5ml: Rs 7.10
for 30ml
Inj : 100mg vial: Rs 4.12
250mg vial: Rs 5.96
500mg vial: Rs 9.04

LAMOXY
(Lyka)

: Caps: 250mg: Rs 6.66 for 3
500mg: Rs 11.84 for 3

6.3.1.4 ANTIPSEUDOMONAL PENICILLINS

6.3.1.4.1 CARBENICILLINIndication

: *Pseudomonas aeruginosa*
and *proteus* spp. infections.

Route/Preparation/
Dose

: Inj : 1g and 5mg vial
Dose: In severe systemic
infections, 5g slow I.V.
every 4-6 hours.
Child: 250-400mg/kg daily in
divided doses.

S.P./C.I.

: As for BENZYL PENCILLIN

Brand/Cost

CARBELIN
(Lyka)

: Inj : 1g vial: Rs 18.39

PYOPEN
(German Remedies)

: Inj : 5g vial: Rs 96.40
1g vial: Rs 226.78 for 10

6.3.2 SULPHONAMIDES & TRIMETHOPRIM

6.3.2.1 SULPHADIAZINEIndication

: Meningococcal meningitis.

Route/Preparation/
Dose

: Tab : 500mg
Inj : 1g per 4 ml.
Dose: Adult: 4g initially,
then 1g 4 hourly
Child: 100-150mg/kg/24 hrs.

Parenteral (IV) used in
severe meningitis.

S.E. : Intolerance; crystalluria;
haematuria; albuminuria;
blood dyscrasia.

C.I. : Hypersensitivity to sulpha
drugs; jaundice; renal
insufficiency; pregnancy;
lactation.

Brand/Cost

SULPHADIAZINE : Tab : 0.5g: Rs 5.99 for 10
(M & B) Inj : 1.0g/4ml: Rs 13.86 for 10

6.3.2.2. SALICYLAZO SULPHAPYRIDINE
(SULPHASALAZINE)

Indication : Ulcerative colitis; acute
Crohn's disease.

Route/Preparation/
Dose : Tab : 500mg
Dose: Acute attack: 1-2g, 4 times
daily
Maintenance: 500mg, 3-4
times daily
Child: over 2 years:
40-60mg/kg daily
Maintenance: 20-30mg/kg/day

S.E. : Nausea, vomiting, rashes,
haematological abnormalities;
hypersensitivity reactions.

C.I. : As for SULPHONAMIDES

Brand/Cost

SALAZOPYRIN : Tab : Rs 18.74 for 10
(Carter Wallace)

6.3.2.3

SULPHAMETHOZAZOLE + TRIMETHOPRIM (COTRIMOXAZOLE)Indication

: Invasive salmonellosis,
typhoid fever, bone and joint
infections due to H.influenzae,
urinary tract infections,
sinusitis, exacerbations of
chronic bronchitis, gonorrhoea
in penicillin-allergic patients.

Route/Preparation/
Dose

: Tab : T. 80mg + S. 400mg
&
T. 160mg + S. 800mg

Suspension: 40mg T + 200mg S./5ml

Inj : (I.V.) 80mg T + 400mg S/5ml
amp.

Dose: Adult: 2 tab BD or DS 1BD

Child: 6-8mg/kg of
Trimethoprim in
2 divided dose.

S.P./C.I.

: As for SULPHONAMIDES

CO-TRIMOXAZOLE
(CMS-I)

: Tab : S.S: Rs 360.00 for 1000
D.S.:Rs 365.00 for 500

SEPTRAN
(Burroughs
Wellcome)

: Tab : Rs 5.83 for 10
Paediatric suspension: Rs 6.62
for 50ml
Paediatric tab: Rs 1.95 for 10

BACTRIM
(Roche)

- : Inj : I.V. 80+400mg/5ml:
Rs 10.72 for 5 amps.
- I.M. 160+800mg/3ml:
Rs 34.51 for 10 amps.
- Suspension: 40+200mg/5ml:
Rs 7.38 for 50ml
- Tab : 80+400mg: Rs 62.62 for 100
- Bactrim DS: 160+800mg:
Rs 11.36 for 10
- Bactrim Paediatric: 20+100mg:
Rs 20.51 for 100

CIPLIN
(Cipla)

- : Tab : 80+400mg: Rs 6.80 for 10
- Ciplin DS: 160+800mg: Rs 13.27 for 10
- Ciplin IM Inj : 160+800mg/3ml:
Rs 19.45 for 5 amps.
- Ciplin Paediatric: Suspension:
40+200mg/5ml: Rs 7.51 for 50ml

6.3.3. CEPHALOSPORINS

6.3.3.1 CEPHALEXIN

Indication

- : Urinary tract infections which do not respond to other drugs or which occur in pregnancy.

Route/Preparation/ Dose

- : Caps : 250mg & 500mg
- Syrup: 125mg/5ml
- Dose: 250-500mg 6 hourly
- Child: 50-100mg/kg in divided doses.

S.P.

: Renal impairment

C.I.: Hypersensitivity to
CepholosporinBrand/CostCEPHALEXIN
(CMS-I)

: Caps : 250mg: Rs 480.00 for 250

SPORIDEX
(Ranbaxy)

: Caps : 250mg: Rs 33.88 for 20

500mg: Rs 63.72 for 10

Drops: 100mg/ml: Rs 14.70 for 10ml

Suspension: 125mg/5ml: Rs 14.87
for 40mlSEPEXIN
(Lyka)

: Caps : 250mg: Rs 9.58 for 4 caps

500mg: Rs 17.70 for 4 caps

Syrup: 125mg/5ml: Rs 16.06

6.3.3.2

CEPHAZOLINIndication: Infections with sensitive
Gram positive and Gram negative
bacteria.Route/Preparation/
Dose: Inj : 500mg/vial
1g/vialDose: Adult: 500mg-1g, 2 or 3
times dailyChild: 15-60mg/kg/day in
divided doses.C.I.: Hypersensitivity to
Cephalosporin

Brand/CostREFLIN
(Ranbaxy):
: Inj : 0.5g vial: Rs 23.13
1.0g vial: Rs 43.25CEFAEZIN
(Rallis): Inj : 500mg: Rs 24.50 for
10ml vial
1000mg: Rs 44.63 for
10ml vial

6.3.3.3

CEFOTAXIMEIndication: Sensitive Gram positive
and Gram negative organisms.Route/Preparation/
Dose: Inj : 250mg & 1g vial
Dose: 1-2g, IM or IV 12 hours
Max. 12g daily in
3-4 doses.
Child: 50-100mg/kg in
2 doses
Neonate: 50mg/kg in
2 doses.S.P.: Known anaphylactic response
to penicillin; severe renal
failure; pregnancy; lactationBrand/CostOMNATAX
(Hoechst): 250mg tab : Rs 44.34
1g tab : Rs 156.00CLAFORAN
(Roussel)

: 1g tab : Rs 156.00

6.3.4 AMINOGLYCOSIDES

6.3.4.1 GENTAMICINIndication

: Septicaemia and neonatal sepsis, meningitis and other CNS infections, biliary tract infections, acute pyelonephritis or prostatitis, endocarditis by streptococcus viridans or faecalis (along with a penicillin).

Preparation/Route/
Dose

: Inj : 40mg/ml - 2ml vial
Dose : 1mg/kg BD or TID.
I.V. or I.M.
Child: 5mg/kg/day in 2 divided doses.

S.E.

: Ototoxicity; nephrotoxicity

C.I.

: Pregnancy; myasthenia gravis

DI

Brand/Cost

GARAMYCIN
(Fulford)

: Inj : 40mg per ml: Rs 7.36 for
1.5 ml amp.
Rs 9.82 for 2ml vial
Paediatric: 10mg per ml:
Rs 4.74 for 2ml vial.

LYRAMYCIN
(Lyka)

: Inj : 40mg per ml: Rs 7.04 for
2ml
Rs 20.51 for 5ml
Paediatric: 10mg per ml:
Rs 4.46 per 2ml

6.3.4.2

KANAMYCINIndication

: Fulminant urinary tract infection; septicaemia, meningitis, bacterial endocarditis.

Route/Preparation/
Dose

: Inj : 500mg/vial
1g/vial

Dose: 5-7.5mg/kg BD, IM

S.P.

: Impaired renal function

C.I.

: Hypersensitivity

Brand/Cost

KANCIN
(Alembic)

: Inj : 0.5g vial: Rs 9.44
1g vial: Rs 16.71

6.3.4.3

NEOMYCIN SULPHATEIndication

: Bowel sterilization before surgery.

Route/Preparation/
Dose

: Caps: 350mg

Dose: 1g every 4 hours.

S.E./S.P./C.I.

: As under Gentamicin.

Avoid in renal impairment.

6.3.5 TETRACYCLINES

6.3.5.1

TETRACYCLINEIndication

: Acute exacerbations of chronic bronchitis; infections due to brucella, chlamydia, mycoplasma and rickettsia.

Route/Preparation/
Dose

: Caps : 250mg & 500mg
Dose : Adult: 1g/day in
2-4 divided doses.

S.F.

: Nausea, vomiting, diarrhoea.

C.I.

: Pregnancy; hypersensitivity;
children below 12 years;
renal failure.

Brand/Cost

TETRACYCLINE
(CMS-I)

: Tab : 250mg: Rs 415.00 for 1000

TETRACYCLINE
(IDPL)

: Caps : 250mg: Rs 60.47 for 100

RESTECLIN
(Sarabhai)

: Caps : 250mg: Rs 6.00 for 10
500mg: Rs 4.00 for 4

6.3.5.2 DOXYCYCLINEIndication

: As for tetracycline;
chronic prostatitis.

Route/Preparation/
Dose

: Caps : 100mg
Dose: 200mg first day;
then 100mg OD
In severe infection 200mg
daily for 5 days.

S.E.

: As for tetracycline

Brand/Cost

TETRADOX
(Ranbaxy)

: Caps : 100mg: Rs 18.71 for 10

MARTIDOX
(Martel Hammer)

: Caps : 100mg: Rs 17.18 for 10
200mg: Rs 15.22 for 4

6.3.6 OTHER ANTIBACTERIAL DRUGS

6.3.6.1 CHLORAMPHENICOL

Indication

: Typhoid fever and life-threatening infections, particularly by *Haemophilus influenzae*. Toxic; reserved for these indications only. Do not use for other systemic infections.

Route/Preparation/ Dose

: Caps : 250mg
Syrup: 150mg/5ml
Inj : 1g & 2g/vial
Dose: In typhoid 50mg/kg/day till afebrile, then reduce to 30mg/kg/day, for total period of 2 weeks.
Child: 50-100mg/kg in divided doses.

S.E.

: Leucopenia; chromocytopenia; irreversible aplastic anemia; peripheral neuritis; optic neuritis; grey baby syndrome.

C.I.

: Pregnancy; breast feeding; neonates.

Brand/Cost

CHLOROMYCETIN
(Parke-Davis)

: Caps : 100mg: Rs 8.80 for 12
500mg: Rs 6.06 for 6
Inj : IM: 1g vial: Rs 2.94;
2g vial: Rs 3.84

PARAXIN
(Boehringer-Knoll)

: Caps : 250mg: Rs 7.17 for 10
500mg: Rs 7.54 for 6
Dragees: 250mg: Rs 66.77 for 100
Granules: 125mg/ml: Rs 13.34
for 60ml

RECLOR
(Sarabhai)

: Caps : 250mg: Rs 8.36 for 12
500mg: Rs 7.54 for 6

6.3.6.2

ERYTHROMYCINIndication

: Alternative to penicillin
in hypersensitive patients;
sinusitis; diphtheria and
whooping cough prophylaxis;
chronic prostatitis.

Route/Preparation/
Dose

: Tab : 250mg
Granules: 125mg/5ml when
reconstituted.
Dose: 250mg/6hourly
500mg/6 hourly
Child: 40mg/kg in
divided doses.

S.E.

: Nausea; vomiting; diarrhoea.

S.P.

: Hepatic impairment.

Brand/CostERYTHROCIN
(Abbot)

: Granules: when mixed 125mg/5ml:
Rs 14.92 for 45ml
Sachets: 200mg: Rs 10.02 for 4
Tab : 100mg: Rs 7.92 for 10
250mg: Rs 18.88 for 10
500mg: Rs 17.70 for 6

ALTHROCIN
(Alembic)

: Granules: 100mg/ml: Rs 10.62
for 10ml
Liquid : 25mg/ml: Rs 16.18
for 60ml
Tab : 100mg: Rs 8.02 for 10
250mg: Rs 18.02 for 10
500mg: Rs 28.29 for 10

6.3.6.3 METRONIDAZOLE

: (See under 6.2.2)

6.3.7 4-QUINOLONES

6.3.7.1 NALIDIXIC ACIDRoute/Preparation/
Dose

: Tab : 500mg
Dose: 1g every 6 hours for
7 days, reducing to 500mg
every 6 hours.
Child: 60mg/kg/day.

S.E.

: Nausea; vomiting; diarrhoea;
allergic reaction; myalgia;
jaundice; convulsions.

C.I.

: Infants below 3 months;
epilepsy; pregnancy.

S.P.

: Impaired renal or hepatic
function; breast feeding.

Brand/CostGRAM-O-NEG
(Ranbaxy): Tab : 500mg: Rs 10.61 for 4
Syrup: 300mg/5ml: Rs 14.33 for 30mlWINTOMYLON
(Win-Medicare): Tab : 500mg: Rs 178.50 for
7x8 tabs
Suspension: 300mg/5ml: Rs 13.90
for 30ml.

6.3.7.2

NORFLOXACINRoute/Preparation/
Dose: Tab : 400mg
Dose: 400mg BD, 7-10 days.C.I.: Hypersensitivity
QuinoloneBrand/CostUROFLOX
(Torrent)

: Tab : 400mg: Rs 15.90 for 2

6.3.8 URINARY TRACT ANTIBIOTICS

6.3.8.1

NITROFURANTOINRoute/Preparation/
Dose: Tab : 100mg
Suspension: 25mg/5ml
Dose: 50-100mg, 3-4 times/day
after food.
Child: 6mg/kg/day in 4 divided
doses.S.E.: Gastro-intestinal disturbances;
polyneuritis; deafness; blood
dyscrasia.

C.I.

: Renal failure.

Brand/CostFURADANTIN
(Eskayef)

: Tabs : Rs 3.91 for 12

Suspension: 25mg/5ml:
Rs 5.56 for 60ml

6.3.8.2

METHANAMINE MANDALATERoute/Preparation/
Dose

: Tab : 500mg, 1g

Dose: Adult: 1g 4 times daily

Child: 500mg, 4 times daily

C.I.

: Renal insufficiency

S.P.

: Acts only in acid pH

Brand/CostMANDLAMINE
(Warner)

: Tab : 0.5g: Rs 11.37 for 30

1.0g: Rs 10.94 for 15

6.3.9 ANTILEPROSY DRUGS

6.3.9.1

CLOFAZIMINERoute/Preparation/
Dose

: Caps : 100mg; 50mg

Dose : 50mg daily and 300mg
once monthly (as part
of multidrug regimen)S.E.: Nausea; giddiness; headache;
diarrhoea; red colouration of
skin and urine; blue black
discolouration of lesions.

C.I. : Pregnancy (1st trimester).

S.P. : Hepatic or renal damage.

Brand/Cost

HANSEPRAN : Caps : 100mg: Rs 180.92 for 100
(S.G. Pharma)

CLOFOZINE : Caps : 50mg: Rs 25.57 for 30
(Astra-IDL) 100mg: Rs 179.46 for 100

6.3.9.2

DAPSONE (DDS)

Preparation/Route/
Dose

: Tab : 25mg, 50mg & 100mg
Dose: 100mg daily as part
of multidrug regimen.

S.E. : Allergic dermatitis;
neuropathy; anorexia; anaemia;
hepatitis; agranulocytosis.

C.I. : 1st trimester of pregnancy.

Brand/Cost

DAPSONE : Tab : 100mg: Rs 60.00 for 1000
(CMS-I)

DAPSONE : Tab : 25mg: Rs 11.93 for 1000
(Acila) 50mg: Rs 15.74 for 1000
100mg: Rs 27.75 for 1000

DAPSONE : Tab : 25mg: Rs 14.63 for 1000
(Burroughs Wellcome) 50mg: Rs 24.14 for 1000
100mg: Rs 46.48 for 1000

6.3.9.3

RIFAMPICINRoute/Preparation/
Dose

: Caps : 300mg, 450mg

Dose: 600mg, once monthly

(450mg for those weighing less than 35kg) as part of multidrug regimen.

S.E.

: Gastro-intestinal symptoms; orange red colouration of urine and body secretion; influenzal syndrome; hepatic reactions; urticaria; thrombocytopenic purpura; acute renal failure.

C.I.

: Jaundice

S.P.

: Reduce dose in hepatic impairment, alcoholism and pregnancy.

D.I.

Brands/CostRIFAMPICIN
(CMS-I): Tab : 300mg: Rs 615.00 for 500
450mg: Rs 920.00 for 500RIFAMYCIN
(Biochem)

: Caps : 450mg: Rs 11.80 for 4

TIBRIM
(Ranbaxy): Caps : 150mg: Rs 103.46 for 100
300mg: Rs 7.82 for 4
450mg: Rs 8.70 for 3RIMPIN
(Lyka): Caps : 150mg: Rs 4.86 for 4
300mg: Rs 8.94 for 4
450mg: Rs 12.50 for 4

NATIONAL LEPROSY ERADICATION PROGRAMME

A. Dapsone monotherapy

1. Multibacillary leprosy.

Dapsone: Adult : 100mg daily

Child : 6-14 years: 50mg daily

Continue till the patient becomes clinically inactive and bacteriologically negative and thereafter for 5 years.

2. Paucibacillary leprosy

Dapsone: Adult : 100mg daily

Child : 6-14 years: 50mg daily

0-5 years: 25mg daily

Treatment continued till patient is clinically inactive and then continued for one year.

B. Multidrug therapy1. Multibacillary leprosy

	Adult	Child 10-14 years	Child 6-9 years
Intensive phase	(14 days)		
Rifampicin	600mg daily	450mg daily	300mg daily
Clofazimine	100mg daily	50mg daily	50mg daily
Dapsone	100mg daily	50mg daily	50mg daily
Continuation phase (minimum duration: 2 years)			
Rifampicin	600mg once monthly	450mg once monthly	300mg once monthly
Clofazimine	300mg once monthly	150mg once monthly	100mg once monthly
	50mg daily	50mg alter- nate days	50mg twice daily
Dapsone	100mg daily	50mg daily	25mg daily

If in the adult, the body weight is less than 35kg, the dose of Rifampicin is reduced to 450mg (instead of 600mg).

2. Paucibacillary leprosy

	Adult	Child 6-14 years	Child 0-5 years
Rifampicin	600mg once monthly	450mg once monthly	300mg once monthly
Dapsone	100mg daily	50mg daily	25mg daily

Adult: body weight less than 35kg: reduce dose of Rifampicin to 450mg.

6.3.10 ANTI-TUBERCULOSIS DRUGS

6.3.10.1 ETHAMBUTOL

Route/Preparation/
Dose

: Tab : 200mg, 400mg & 800mg
Dose: Adult : 15mg/kg daily
Child: 25mg/kg daily--
2 months, then
15mg/kg daily

S.E.

: Optic neuritis; visual disturbance
peripheral neuritis (regular
eye check up advised).

S.P.

: Reduce dose in renal impairment.

C.I.

: Young children; elderly
patients; optic neuritis.

Brand/CostETHAMBUTOL
(CMS-I): Tab : 400mg: Rs 492.00 for 1000
800mg: Rs 565.00 for 600MYAMBUTOL
(Lederle): Tab : 200mg: Rs 4.18 for 10
400mg: Rs 6.76 for 10
800mg: Rs 7.80 for 6MYCOBUTOL
(Cadila): Tab : 200mg: Rs 4.18 for 10
400mg: Rs 6.76 for 10
600mg: Rs 9.81 for 10
800mg: Rs 12.82 for 10
1000mg: Rs 13.11 for 10THEMIBUTOL
(Themis): Tab : 200mg: Rs 36.60 for 100
400mg: Rs 59.20 for 100
600mg: Rs 85.90 for 100
800mg: Rs 112.20 for 100
1000mg: Rs 158.20 for 100

6.3.10.2

ISONIAZIDRoute/Preparation/
Dose: Tab : 100mg, 300mg
Dose: Adult: 300mg/day
Child: 10-20mg/kg/daily
in divided doses.S.E.: Nausea, vomiting, hypersensitivity
reactions, rashes, peripheral
neuritis.S.P.: Impaired renal and hepatic
function; epilepsy; alcoholism;
breast feeding.

Brand/CostISONEX
(Pfizer)

: Tab : 100mg: Rs 7.40 for 100

ISONIAZIDE
(Haffkine): Tab : 100mg: Rs 7.40 for 100
300mg: Rs 15.43 for 100

6.3.10.3

PYRAZINAMIDERoute/Preparation/
Dose: Tab : 500mg, 750mg
Dose: 25mg/kg/dayS.E.: Hepatotoxicity; nausea,
vomiting; arthralgia;
sideroblastic anaemia;
urticaria.S.P.: Impaired renal function;
diabetes and gout.
Advise periodic liver
function tests.Brand/CostCOPYRAZIN
(PCI): Tab : 500mg: Rs 15.30 for 10
750mg: Rs 20.65 for 10
1000mg: Rs 26.00 for 100LYNAMIDE
(Lyka): Tab : 500mg: Rs 15.30 for 10
750mg: Rs 21.90 for 10COXAMIDE
(Aristo): Tab : 500mg: Rs 15.00 for 10
750mg: Rs 22.50 for 10

6.3.10.4

RIFAMPICINRoute/Preparation/
Dose

: Caps : 150mg, 300mg, 450mg
 Dose: 450-600mg (about 10mg/kg)
 daily.
 Child: 10-20mg/kg/daily
 1 hour before breakfast.

S.E./S.P./C.I./
Brand/Cost

: See 6.3.9.3

6.3.10.5

STREPTOMYCINRoute/Preparation/
Dose

: Inj : 1g vial; 750mg vial
 Dose: 1g daily IM
 Age above 40 years:
 750mg daily
 Small patient: 500mg daily
 Child: 20-40mg/kg body
 weight

S.E.

: As for aminoglycosides;
 also hypersensitivity reactions;
 paraesthesia of mouth.

S.P./C.I.

: As for aminoglycosides.

Brand/Cost

AMBISTRYN-S
 (Sarabhai)

: Inj : 1g vial: Rs 4.01
 0.75g vial: Rs 3.45

6.3.10.6

THIACETAZONE + INHRoute/Preparation/
Dose

: Tab : Thiacetazone 150mg
 INH 300mg
 Dose: Adult : 1 tab daily

S.E. : Rash
C.I. : Hepatic or renal failure;
 psychosis.

Brand/Cost

ISOKIN-T FORTE : Tab : Rs 2.40 for 10
 (Warner)

6.4 ANTIFILARIAL DRUGS

6.4.1 DIETHYLCARBAMAZINE

Route/Preparation/
Dose

: Tab : 50mg, 100mg
 Syrup: 50mg/5ml - 60ml
 120mg/5ml - 60ml
 Dose: Filariasis; 2mg/kg
 single dose 1st day;
 2 such doses on 2nd day;
 3 doses daily thereafter
 for 3-4 weeks.
 Tropical eosinophilia: 6mg/kg
 daily in 3 divided doses
 for 1 month; repeat 2 such
 courses at interval of
 3 months.

S.E. : Transient headache; dizziness;
 fever; urticaria; conjunctivitis;
 keratitis
 as allergic response due to
 destruction of micro filaria.

Brand/Cost

DIETMYL CARBAMAZINE : Tab : 100mg: Rs 82.00 for 100
 (CMS-I)

BANOCIDE
(BW)

: Tab : 50mg: Rs 0.53 for 10
Syrup: 120mg per 5ml: Rs 3.37 for 60ml
Banocide forte: 100mg Tab: Rs 0.59
for 10
Banocide paediatric syrup: 50mg per
5ml: Rs 2.80 for 60ml

HETRAZAN
(Lederle)

: Tab : 50mg: Rs 0.75 for 10
100mg: Rs 8.90 for 100
Syrup: 120mg per 5ml: Rs 3.70
for 57ml

NATIONAL FILARIA CONTROL PROGRAMME

Diethylcarbamazine: 6mg/kg body weight

daily - 12 doses to be completed in
2 weeks (six days in a week).

Age group -----	Single dose -----
Above 18 years	300mg
12-17 years	225mg
6-11 years	150mg
2-5 years	75mg
1 year	30mg

S.P.: Not to be administered on empty stomach.

C.I.: Infants, infirm and old persons, pregnancy, chronically ill (heart, lung, kidney).

S.E.: Fever, nausea, vomiting, gastro-intestinal disturbances, allergic rashes, lymphangitis.

6.5 ANTIFUNGAL

6.5.1

AMPHOTERICIN BRoute/Preparation/
Dose

: Powder for injection: 50mg/vial
 Dose: 250mg/kg, gradually
 increasing if tolerated
 1mg/kg daily, or 1.5mg/kg
 daily on alternate days
 4-8 weeks.

S.E.

: Fever; anorexia; nausea;
 vomiting; hypokalaemia;
 nephrotoxicity; tinnitus.

S.P.

: Avoid use with other
 nephrotoxic drugs.
 Renal function to be monitored

Brand/Cost

FUNGIZONE
 (Squibb)

: Inj : 50mg vial: R 28.45

6.5.2

GRISEOFULVINRoute/Preparation/
Dose

: Tab : 125mg
 Dose: Adult: 4 tabs daily
 Child: 2 tabs daily
 with meals.

S.E.

: Headache; nausea; vomiting;
 rashes; photosensitivity.

C.I.

: Liver failure; porphyria;
 pregnancy.

Brand/Cost

GRISOVIN : Tab : 125mg: Rs 4.49 for 10
(Glaxo)

IDIFULVIN : Tab : 125mg: Rs 4.12 for 10
(IDPL)

6.5.3

NYSTATIN

Route/Preparation/
Dose

: Tab : 500,000 U
Dose: 1 tab TID

S.E.

: Nausea; vomiting;
diarrhoea.

Brand/Cost

MYCOSTATIN : 500,000 U : Rs 24.13
(Sarabhai) for 12 tab

6.5.4

KETOCONAZOLE

Route/Preparation/
Dose

: Tab : 200mg
Dose: Adult: 200mg once
daily for 14 days.
Child: above 2 years:
3.3-6.6mg/kg once daily

S.E.

: Hepatitis; rashes; pruritis.

C.I.

: Pregnancy
Hepatic impairment

Brand/Cost

FUNGICIDE : Tab : 200mg: Rs 65.00 for 10
(Torrent)

6.6 ANTI-LEISHMANIASIS DRUGS

6.6.1 SODIUM STIBOGLUCONATE

Route/Preparation/
Dose

: Inj : 100mg/ml
Dose: 10mg/kg daily for 30 day
by IM or IV injection
For skin lesions : 10 days
treatment.

S.E.

: Anorexia, vomiting,
cough, substernal pain.

C.I.

: Pneumonia; myocarditis;
nephritis; hepatitis.

Brand/Cost

SODIUM ANTIMONY
GLUCONATE
(Albert David)

: Inj : 333mg/ml: Rs 34.84 for 30

STIBANATE
(Gluconate)

: Inj : 100mg/ml : Rs 29.53 for 30

6.7 ANTIMALARIAL DRUGS

6.7.1 CHLOROQUINE

Route/Preparation/
Dose

: Tab : 150mg of base
Dose: 600mg as initial dose
following 300mg after
6 hours; then 300mg OD on
2nd & 3rd day.
Child: 10mg/kg followed
6 hours later by 5mg/kg
and 5mg/kg ODx3 days.
Inj : 40mg base/ml-5ml
Dose: 200-300mg base slow I.V.
infusion over 4 hours.
For children IV infusion
5mg/kg of base over 4 hr

If I.V. not possible, I.M.
3mg/kg base repeated 8 hourly
until oral therapy possible.

Syrup: 100mg/10ml.

S.E.

: Headache; nausea; vomiting;
diarrhoea; rashes; pruritus;
psychotic episodes; convulsion;
corneal & retinal changes with
high doses (prolonged).

S.P.

: Renal and hepatic dysfunction;
psoriasis; porphyria;
Ocular examination in long use.

Brand/Cost

CHLOROQUINE
(CMS-I)

: Tab : 250mg: Rs 205.00 for 1000

RESOCHIN
(Bayer)

: Tab : 250mg: Rs 32.88 for 100

NIVAQUINE
(M & B)

: Tab : 150mg: Rs 3.35 for 10
Syrup: 50mg per 5 ml: Rs 6.00 for 50ml
Inj : 40mg per ml, 2ml amp.: Rs 12.20
for 10 amps.

6.7.2 AMODIAQUINE

Route/Preparation/
Dose

: Tab : 200mg base
Dose: Same as Chloroquine.

S.E.

: Nausea; vomiting; diarrhoea;
agranulocytosis; peripheral
neuropathy.

S.P./C.I.

: As under Chloroquine.

Brand/CostCAMOQUIN
(P.D. & Co)

: Tab : 0.2g: Rs 2.88 for 10

6.7.3

PRIMAQUINERoute/Preparation/
Dose

: Tab : 7.5mg

Dose: 15mg daily for 14 days

Child: 7.5mg daily for 14 days
(for radical cure in P. vivax
and P. orale).S.E.: Anorexia; nausea; bone marrow
depression; methaemoglobinuria;
haemolytic anaemia.S.P.: In G 6PD deficiency can cause
haemolysis.Brand/CostPRIMAQUINE PHOSPHATE : Tab : 2.5mg: Rs 4.54 for 100
(IDPL)

6.7.4

QUININERoute/Preparation/
Dose

: Tab : 300mg

Inj : 300mg/ampoule.

Dose: Adult: 600mg every 8 hours,
for 5 days.Child: below 1 year: 1/10
adult dose.Older child: $\frac{\text{age} \times \text{adult dose}}{20}$

Inj : (Chloroquin resistant seriously ill patient)

I.V. infusion 10mg/kg over 4 hours--repeat 8 hourly x 3 doses.

Max: not more than 1.8g in 24 hours.

Children above 3 months I.V. or IM quinine;
IM dose 5mg/kg.

S.E.

: Cinchonism; tinnitus; headache; nausea; abdominal pain; rashes; visual disturbances; hypersensitivity reaction.

S.P.

: Atrial fibrillation; conduction defects; heart block; pregnancy.

Brand/Cost

QUININE
(Bengal
Immunity)

: Inj : 2ml amp: Rs 19.37 for 10

QUININE
(GLUCONATE)

: 0.3g per ml: Rs 28.64 for 25 amps.
0.6g per 2ml: Rs 47.51 for 25 amps.

6.7.5

SULFADOXINE + PYRIMETHAMINE

Route/Preparation/
Dose

: Tab : 500mg S + 25mg P
Dose: After treatment with Quinine--
3 tabs single dose (adult)
for prophylaxis: 2 tabs/week.

S.E.

: Bone marrow depression with prolonged treatment; rashes.

S.P.

: Hepatic or renal dysfunction.

Brand/Cost

RINODAR : Tab : 6.95 for 2
(Anglo French)

6.7.6

SULPHAMETHOPYRINE + PYRIMETHAMINE

Route/Preparation/
Dose : Tab : 500mg S + 25mg P

See literature.

Brand/Cost

METAKELFIN : Tab : Rs 7.69 for 2
(Walter-Bushnell)
Suspension: 500mg + 25mg
per 10ml: Rs 9.81 for 10ml

6.8 ^SANTIHISTOSOMAL DRUGS

6.8.1

PRAZIQUANTEL

Route/Preparation/
Dose : 40mg/kg as a single dose;
60mg/kg in 3 divided doses
in one day for S. Japonicum.

S.E./Brand/Cost : Biltricide. See literature.

7. ANTI-NEOPLASTIC DRUGS

Only certain tumours are highly sensitive to chemotherapy. Great care should be taken not to damage normal cells as selectivity of action on cancer cells alone is not specific. Cytotoxic drugs may be used either singly or in combination therapy. Drug combinations are frequently more toxic than single drugs but has the advantage of enhanced response and increased survival.

Most cytotoxic drugs are teratogenic and all may cause life threatening toxicity. Administration should, where possible, be confined to those experienced in their use.

Almost all of them produce similar side effects. Extra vasation of intravenous drugs can cause severe local tissue necrosis as they are irritants.

Nausea and vomiting of varying extent occur with many of them. Severe emesis is unlikely with alkylating agents, I.V. flououracil, vinca alkaloids or methotrexate. Antihistamines such as promethazine is sufficient to treat this. Moderate emesis occurs with cyclophosphamide and daunorubicin. Premedication with lorazepam or diazepam and dexamethasone will clear the situation.

Severe emesis is seen with mustine, dacarbazine and cisplatin. They are also best treated with dexamethasone and lorazepam given before and 6 hours after chemotherapy.

Bone marrow depression all compounds except vincristine and bleomycin cause marrow depression. Peripheral blood counts must be checked prior to each treatment and doses should be reduced or therapy delayed if marrow recovery has not occurred.

Alopecia reversible hair loss is a common complication and varies from patient to patient with drugs. Cyclophosphamide is known to produce this.

Urothelial toxicity is a problem with cyclophosphamide.

7. ANTINEOPLASTIC & IMMUNOSUPPRESSIVE DRUGS
(Consult literature for details.)

7.1 IMMUNOSUPPRESSIVE

7.1.1 AZATHIOPRINE

Preparation : Tab : 25mg; 50mg.

Brand/Cost

IMURAN : Tab : 50mg: Rs 381.79 for 100
(B.W.)

7.2 CYTOTOXIC DRUGS

7.2.1 ALKYLATING AGENTS

7.2.1.1 CYCLOPHOSPHAMIDE

Route/Preparation : Tab : 10mg, 50mg
Powder for Inj: 500mg in vial

Brand/Cost

ENDOXAN-ASTA : Tab : 10mg: Rs 8.15 for 10
(Khandelwal)

7.2.1.2 CHLORAMBUCIL

Preparation : Tab : 2mg

Brand/Cost

LEUKERAN : Tab : 2mg: Rs 26.37 for 100
(Burroughs Wellcome)
5mg: Rs 60.45 for 100

7.2.1.3

BUSULPHANPreparation

: Tab : 2 mg

Brand/Cost

MYELERAN

(Burroughs Wellcome)

: Tab : 0.5mg: Rs 6.07 for 100

2mg: Rs 14.25 for 100

7.2.2

CYTOTOXIC ANTIBIOTICS

7.2.2.1

DOXORUBICINRoute/Preparation: Powder for Injection: 10mg,
50mg in vial.Brand

ADRIAMYCIN

ADRIABLASTINA

(Walter Bushnell)

7.2.2.2

MITOMYCINRoute/Preparation: Powder for injection: 2mg,
10mg, 20mg in vial.Brand

MITOMYCIN-C KYOWA

(Biochem)

7.2.2.3

BLEOMYCIN

: Powder for injection.

7.2.2.4

ACTINOMYCIN-D

: Inj : 2mg vial; 10mg vial.

7.2.3 ANTIMETABOLITES

7.2.3.1 METHOTREXATE

Route/Preparation : Tab : 10mg and injection.

7.2.3.2 MERCAPTOPURINE

Route/Preparation : Tab : 50mg

Brand/Cost

PURI-NETHOL : Tab : 50mg: Rs 22.98 for 25
(Burroughs Wellcome)

7.2.3.3 FLUOURACIL

Route/Preparation : Caps : 250mg
Inj : 25mg

Brand/Cost

FLURACIL : Cap : 250mg: Rs 37.20 for 10
(Biochem)
Inj : 250mg per ml, 5ml amp:
Rs 33.30 for 5 amp
500mg per ml, 10ml amp:
Rs 66.55

7.2.4 VINCA ALKALOIDS

7.2.4.1 VINBLASTINE

Route/Preparation : Powder for Injection:
10mg in vial.

Brand/Cost

VINBLASTIN-RICHTER : Inj : 10mg: Rs 73.96
(Khandelwal)

7.2.4.2 VINCRIStINE

Route/Preparation : Powder for Inj: 1mg, 5mg in vial

Brand

VINCRIStIN : Inj : 1mg vial.
(Khandelwal)

7.2.5 OTHER CYTOTOXIC DRUGS

7.2.5.1 PROCARBAZINERoute/Preparation : Cap : 50mgBrandNATULAN
(Roche)

7.3 HORMONES AND ANTIHORMONES

7.3.1 DEXAMETHASONERoute/Preparation : Tab : 0.5mg
Inj : 4mg/mlBrand

DECADRON

7.3.2 FOSFESTROL

Route/Preparation/
Dose : Tab : 100mg
Inj : 55.2mg/ml
Dose: 100-200mg three times
daily, reduce to 100-300
daily.Brand/CostHONVAN
(Khandelwal-Asta): Inj : 250mg/5ml amp: Rs 6.49 per amp.
Tab : 100mg: Rs 39.52 for 20

7.3.3

MEDROXYPROGESTERONE ACETATERoute/Preparation : Tab : 100mgBrand/Cost

FARLUTAL : Tab : 10mg: Rs 28.12 for 10
 (Walter Bushnell) 100mg: Rs140.00 for 10

7.3.4

PREDNISOLONERoute/Preparation : Tab : 5mgBrand/Cost

DELTACORTIL : (See 3.2.4)
 (Wymesone)

7.3.5

TAMOXIFENRoute/Preparation : Tab : 10mg, 20mg.Brand/Cost

TAMOFEN : Tab : 10mg: Rs 240.00 for 100
 (T.N. Dadha)

Before initiating treatment it is essential to determine which type of anaemia is present.

Iron-deficiency anaemias: The only justification for iron treatment is the presence of a demonstrable iron-deficiency state. Prophylaxis is justifiable in Pregnancy, menorrhagia, after subtotal or total gastrectomy, and in the management of low birth-weight infants such as premature babies, twins, and infants delivered by Caesarean section. Iron salts should be given by mouth unless there are good reasons for using another route.

Ferric salts are much less well absorbed and ferrous salts preferred. Haemoglobin regeneration rate is little affected by the type of salt used provided sufficient iron is given. Choice of preparation is thus usually decided by incidence of side-effects and cost. The incidence of side-effects due to ferrous sulphate is no greater than with other iron salts and is the cheapest. Treatment should be continued in cases of anaemia for a further three months in an attempt to replenish the iron stores. The therapeutic advantage of compound preparations are minimal and cost may be increased. There is neither theoretical nor clinical justification for the inclusion of other therapeutically active ingredients, such as the B group of vitamins (except folic acid for pregnant women).

ANTICOAGULANTS

The main use of anticoagulants is to prevent thrombus formation or the extension of an existing thrombus and are therefore widely used in the prevention and treatment of deep thrombosis in the legs. Anticoagulants are of less use in preventing thrombus formation in arteries and to prevent thrombus forming on prosthetic heart valves.

HEPARIN given parenterally is rapidly effective. As its effects are short-lived it is best given by continuous infusion. If given by intermittent intravenous injection, the interval between doses must not exceed 6 hours. Oral anticoagulants are started at the same time, and the heparin infusion withdrawn after 3 days.

If oral anticoagulants cannot be given and heparin is continued, its dose is adjusted after determination of the activated partial thromboplastin time.

If haemorrhage occurs it is usually sufficient to withhold heparin, but if rapid reversal of the effects of heparin is required protamine sulphate is a specific antidote.

Oral anticoagulants antagonise the effects of vitamin K and take at least 36 to 48 hours for the effect to develop. If an immediate effect is required, heparin must be given concomitantly.

The main indication for oral anticoagulant therapy is deep-vein thrombosis, in patients with heart valve prostheses, to prevent emboli developing on the valves. Antiplatelet drugs may also be useful in these patients.

8. BLOOD--DRUGS AFFECTING

8.1 ANTIANAEMIA DRUGS

8.1.1 FERROUS SULPHATEIndication

: Iron deficiency anaemia.

Route/Preparation/
Dose

: Tab : 200mg

Dose: Therapeutic 120-180mg
daily in divided doses.

Prophylactic: 60mg daily

Children: therapeutic: 6mg/kg
(elemental iron)Prophylactic: 1mg/kg
(elemental iron)S.E.: Large doses cause gastro-intestinal
irritation; vomiting; diarrhoea;
constipation may occur with
continued administration.Brand/CostFERROUS SULPHATE
(Ranbaxy)

: Rs 25.00 for 1000 tabs.

8.1.2 FERROUS SALT + FOLIC ACIDIndication

: Prophylaxis in pregnancy.

Preparation/Route/
Dose

: Spansule

Ferrous sulphate 150mg

Folic acid 0.5mg

S.E.

: As for Ferrous sulphate.

Brand/CostFEFOL
(Eskayef)

: Caps : Rs 8.59 for 15.

8.1.3

FERROUS SALT + FOLIC ACID + HYDROXYCOBALAMIN (B12)

Indication : Prophylaxis in pregnancy.

Preparation/Route/
Dose : Tab : Ferrous fumarate 200mg
Vit B₁₂ 10 microgram
Folic Acid 1 mg.

Brand/Cost

MACRAFOLIN IRON : Tab : Rs 30.53 for 500
(Glaxo)

8.1.4

FOLIC ACID

Indication : Anaemia of pregnancy

Preparation/Route/
Dose : Tab : 5 mg
Initially 15mg daily
Maintenance 5-10mg daily.

S.p. : Not to be given alone in
Addisonism.
Pernicious anaemia and other
Vit B₁₂ deficiency states.

Caution in patients with folate
dependent tumours and epileptic
(lowers plasma concentration
of phenytoin).

Brand/Cost

FOLVITE : Tab : 5mg: Rs 0.81 for 10
(Lederle)
Inj : 15mg per ml: Rs 3.59 for
10ml vial.

8.1.5 HYDROXOCOBALAMIN (Vit B₁₂)

<u>Indication</u>	: Anaemias of pregnancy Megaloblastic anaemias Addisonism; pernicious anaemia; Subacute combined degeneration.
<u>Preparation/Route/ Dose</u>	: Inj : 1mg/ml Dose: 1mg, I.M.; inj. repeated 5 times at interval of 2-3 days. Maintenance dose: 1mg every 3 months Child: dosage as per adult.

8.1.6 IRON DEXTRAN

<u>Indication</u>	: Iron deficiency anaemia, when oral treatment has failed.
<u>Preparation/Route/ Dose</u>	: Inj : 2ml ampoule I.V. infusion - 20ml amp.
<u>S.E.</u>	: Rarely severe anaphylaxis. Transient nausea, vomiting. Occasionally severe dyspnoea.
<u>S.P.</u>	: Test dose essential.
<u>C.I.</u>	: ARF. Severe liver disease. I.V. infusion in asthmatics.
<u>Brand/Cost</u>	
IMFERON (Ralli-Fuson)	: Inj : 50mg/ml: Rs 9.94 for 10ml vial.

8.1.7 IRON SORBITOLIndication : Iron deficiency anaemiaPreparation/Route/
Dose : IM Inj. 2ml ampoule.C.I. : Liver disease.
Pyelonephritis.
Untreated U.T.I.S.P. : Oral administration of iron
should be stopped atleast 24
hours before giving iron sorbitol
injection.Brand/CostJECTOFER : Inj : 50mg/ml : Rs 4.03 for 1.5ml
(CFL-Pharma)8.1.8 IRON TONICBrand/CostTONOFERON : Liquid : Rs 9.34 for 85ml
(East India) Drops : Rs 6.98 for 15ml8.1.9 FERRIC AMMONIUM CITRATE MIXTURE, PAEDIATRIC

Ferric ammonium citrate 80mg

Chloroform spirit 0.5ml

Water to 10ml

Contains approximately 15mg elemental iron in 10ml.

8.2 ANTICOAGULANTS

8.2.1 HEPARINIndication : Deep vein thrombosis; disseminated
intravascular coagulation,
prevention of post-operative
thrombosis. Thromboembolic conditions

Preparation/Route/
Dose

- : IV or SC inj.
- 1000 IU/5ml vial
- 5000 IU/5ml vial

S.P.

- : Pregnancy

C.I.

- : Haemophilia and other haemorrhagic disorders; peptic ulcer; severe hypertension; severe liver disease; recent surgery of eye or nervous system. Hypersensitivity to heparin.

Brand/Cost

HEPARIN
(Biological
Evans)

- : Inj : 1000 IV : Rs 9.00 for 5ml vial
- 5000 IV : Rs 35.00 for 5ml vial

Antidote

- : Protamine Sulphate $1\frac{1}{2}$ --5ml ampoule by slow I.V. injection
- 1mg neutralises 100 units Heparin.

8.2.2

WARFARIN SODIUMIndication

- : Deep vein thrombosis; transient ischaemic attacks; prophylaxis with prosthetic valves.

Preparation/Route/
Dose

- : Tab : 5mg
- Dose: to be adjusted by regular check on Prothrombin time.

S.E.

- : Haemorrhage.

C.I.

: Pregnancy; peptic ulcer;
severe hypertension;
bacterial endocarditis.

S.P.

: Hepatic or renal disease;
recent surgery.

Brand/Cost

UNIWARFIN
(Unichem)

: Tab : 5mg : Rs 1.89 for 25

Antidote

: Vit. C.

8.3 ANTIPLATELET

8.3.1 ASPIRINIndication

: Thromboembolic disorders;
transient ischaemic attacks;
unstable angina.

Preparation/Route/
Dose

: Tab : 300mg
Dose: 150mg OD

S.E./C.I./Brand/
Cost

: (See 3.1.1)

8.3.2 DIPYRIDAMOLEIndication

: Post myocardial infarction;
prophylaxis in ischaemic
heart disease; transient
ischaemic attacks; peripheral
vascular disease.

Preparation/Route/
Dose

: Tab : 25mg, 100mg
Dose for inhibition of
platelet aggregation: 300-400mg/day
Other conditions: 25mg TID

S.E.

: Nausea, diarrhoea, hypotension;
throbbing headache.

S.P.

: May exacerbate migraine;
hypotension.

Brand/Cost

PERSANTIN
(German Remedies)

: Tab : 25mg: Rs 18.34 for 100
100mg: Rs 19.40 for 30

DEPLATOL
(Martel Hammer)

: Tab : 25mg: Rs 2.30 for 10
100mg: Rs 8.21 for 10

8.4 FIBRINOLYTIC DRUGS

8.4.1 STREPTOKINASEIndication

: Deep vein thrombosis; pulmonary
embolism; myocardial infarction;
arterial thromboembolism.

Preparation/Route/
Dose

: By I.V. infusion
250,000-600,000 units over
30-60 min; then 100,000 units
every hour up to 48-72 hours.
750,000 units over $\frac{1}{2}$ hour in
myocardial infarction.

01746
DR 400

COMMUNITY HEALTH CELL
326, V Main, I Block
Koramangala
Bangalore-560034
India

- S.E. : Allergic reactions; fever; rashes; haemorrhage.
- S.P. : Atrial fibrillation; recovering from streptococcal infections.
- C.I. : Recent haemorrhage; severe hypertension; menstruation; pregnancy; streptococcal infections.

Brand/Cost

- KABIKINASE
(Kabi Vitrum)
- : 250,000 IU : Rs 465.30
750,000 IU : Rs 929.70
1,500,000 IU: Rs 1653.30

8.5 HAEMOSTATICS

8.5.1 CALCIUM GLUCONATE

Indication

- : Often used as an adjunct with other haemostatics but may not be useful. Repeated blood transfusion Hypocalcaemic states.

Preparation/Route/
Dose

- : Slow I.V.
Inj. 10% solution
10ml ampoule.

S.P.

- : Extravasation may cause local sloughing.

Brand/Cost

CALCIUM
(Sandoz)

- : Inj : 137.5mg/ml,
5ml amp: Rs 12.09 for 10
10ml amp: Rs 7.23 for 5

8.5.2

EPSILON AMINOCAPROIC ACIDIndication

: Control of haemorrhage in obstetrics; to reduce bleeding in post prostatectomy and tonsillectomy; mouth bleeding in haemophilia.

Preparation/Route/Dose

: Inj: 250mg/ml--20ml vial

Tab: 500mg

Dose: I.V. 5g stat followed by 1g hourly till response obtained.

Children: 100mg/kg I.V. and maintained by 33mg/kg.

Brand/Cost

AMICAR
(Cynamid)

: Inj : 250mg per 20ml:
Rs 24.55 per 20ml vial.

8.5.3

VITAMIN KIndication

: Hypoprothrombinaemia in hepatocellular disease or obstructive jaundice following oral anticoagulants treatment.

Prophylactic in newborns and bleeding in neonates.

Preparation/Route/Dose

: Inj : 10mg/ml--1ml amp.

Tab : 10mg

Dose: 10mg/day in adults
Newborns 1mg, IM.

S.P.

: Can aggravate jaundice in newborn.

Large doses produce haemolytic anaemia, hyperbilirubinaemia and kernicterus in newborn.

Brand/Cost

KAPLIN
(Allenbury's)

: Inj : 10mg/ml: Rs 9.00 for 6 amp.
Tab : 10mg: Rs 8.24 for 100

9. BLOOD PRODUCTS & BLOOD SUBSTITUTES

9.1 PLASMA SUBSTITUTE

9.1.1 DEXTRAN

Indication

: Short term blood vol expansion (Dextran 70); prophylaxis of post surgical thromboembolic disease (Dextran 40).

Preparation/Route/ Dose

: I.V. infusion: 500ml bottle
Dextran 70
Dextran 40
in dextrose or saline.

S.E.

: Rarely anaphylactoid reactions.

C.I.

: Severe congestive cardiac failure; renal failure; bleeding disorders, eg., thrombocytopenia.

S.P.

: Blood sample for cross matching should ideally be taken before infusion.

Brand/Cost

LOMODEX
(Rallis-Fison)

: 10% in normal saline: Rs 57.58
per 540ml
10% in 5% dextrose: Rs 57.58
per 540ml

LOMODEX 70
(Rallis-Fison)

: 6% in normal saline: Rs 46.76
per 540ml
6% in 5% dextrose: Rs 46.76
per 540ml

9.1.2

GELATINIndication

: Blood volume expansion

Preparation/Route/
Dose

: I.V infusion: 500ml

S.E.

: Hypersensitivity reaction

S.P./C.I.: Do not use solution if not clear
Cardiac failure.
Hypersensitivity reaction.Brand/CostHAEMACCEL
(Hoechst)

: Rs 59.78 for 500ml

9.2 PLASMA FRACTIONS FOR SPECIFIC USES

9.2.1

ALBUMIN, HUMAN SERUM : See literature

9.2.2

FIBRINOGEN (Human) : See literature

Most patients with angina pectoris are treated with beta-blockers or calcium channel blockers. However, short acting nitrates retain an important role both for prophylactic use before exertion and for chest pain occurring at rest. Nitrates are sometimes used as sole therapy, especially in elderly patients with frequent symptoms.

By reducing cardiac work, Beta-blockers improve exercise tolerance and relieve symptoms in patients with angina. No one drug has been proven to be superior to another, although a patient may occasionally respond better to a specific beta blocker. There is some evidence that sudden withdrawal may cause an exacerbation of angina. Therefore, gradual reduction of dose is preferable when beta blockers are to be stopped. They should not be used in patients with incipient cardiac failure, second or third degree heart block, asthma, and in diabetics with frequent episodes of hypoglycemia. Beta blockers used in angina are - propranolol, atenolol, metoprolol, acebutolol, nadolol, pindolol and oxprenolol - of these atenolol and metoprolol are preferred because of their cardioselective action.

Verapamil, nifedipine and diltiazem are calcium channel blockers available for use in angina. They reduce myocardial contractivity and coronary and systemic vascular tone. Verapamil may precipitate heart failure, exacerbate conduction disorders and cause hypotension at high doses. It should be used with caution when combined with beta blockers. Nifedipine has less effects on the myocardium and rarely precipitates heart failure. Minor side effects associated with vasodilatation such as flushing, head ache and ankle swelling are common. Verapamil and nifedipine are valuable in forms of angina associated with unusual coronary constriction. Diltiazem is effective in most forms of angina, and can be used in those patients for whom beta blockers are contraindicated or ineffective.

Sublingual glyceryl trinitrate is one of the most effective drugs for providing rapid angina relief but its effect lasts only 20 to 30 minutes. Its principal benefit follows from a reduction in venous return which reduces left ventricular work. Side effects include head ache, flushing and postural hypotension. The percutaneous preparations may be useful in the prophylaxis of

nocturnal or rest angina. Isosorbide dinitrate is effective sublingually and orally. The effect is slower in onset but longer lasting. Injectable forms of nitrates may be tried when the sublingual form is ineffective in patients with chest pain due to myocardial infarction or severe ischemia.

ANTI-HYPERTENSIVES

Patients whose average diastolic B.P. exceed 100 mm Hg should receive anti-hypertensive therapy. Below this level, the benefits of therapy are unproven. The aim of therapy is to reduce diastolic BP to below 100 mm Hg.

"Step-care" therapy is probably still the best anti-hypertensive strategy. The first step is non-drug treatment wherein the patient is advised to cut down on salt and alcohol intake and attain his ideal weight.

Step two involves the use of any thiazids diuretic e.g., hydrochlorothiazide, benfluthiazide in the lowest possible dose. Potassium supplements and potassium sparing diuretics (triamterene or amiloride - in the absence of hypokalemia) are usually not needed.

Beta blockers, e.g., atenolol, metoprolol can then be used in combination with a thiazide diuretic when they are not effective alone. Calcium channel blockers (nifedipine, Verapamil) are considered when thiazides and beta-blockers are contraindicated, are not tolerated or fail to control BP. Nifedipine acts primarily as an arteriolar vasodilator and can be combined with a beta-blocker while verapamil by virtue of its negative inotropic and chronotropic effects should never be combined with a beta blocker.

Captopril (an angiotensin converting enzyme inhibitor) is a potent vasodilator though side effects such as proteinuria, rashes and leucopenia are encountered at high dose. Enalapril is a newer ACE inhibitor not yet proven to be superior to captopril. Both drugs can produce a precipitous drop in BP in patients with renal

impairment and/or receiving diuretic therapy, and should therefore be given in low initial doses.

Vasodilators such as, hydralazine, can be added to a regimen of thiazide and beta blocker. Diazoxide is diabetogenic and is used only in hypertensive emergencies when it can be given intravenously. Sodium nitroprusside I.V. is also very useful in a hypertensive crisis. Minoxidil, a highly potent drug, should be reserved for the treatment of severe hypertension, always combining it with a beta blocker and a diuretic since patients develop fluid retention. Hypertrichosis is troublesome and renders minoxidil unsuitable for women. /e

Centrally acting hypertensives such as methyldopa, clonidine and reserpine have declined in their popularity. Methyldopa, however, has the advantage of being safe in asthmatics, heart failure and pregnancy. Side effects such as depression, sedation, impotence and liver damage can be minimised by keeping the daily dose below 1 gm. Clonidine has the disadvantage of withdrawal results in hypertensive crisis. Reserpine can cause sedation, nasal congestion, postural hypotension and depression but if in low doses and at night, is useful in mild hypertension.

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CARDIAC GLYCOSIDES

Cardiac glycosides are most useful in the treatment of supraventricular tachycardias. Except when needed to maintain satisfactory rhythm, cardiac glycosides can often be withdrawn from patients with heart failure that is well controlled, without clinical deterioration. Their use for heart failure alone is therefore best avoided in the elderly who are particularly susceptible to digitalis toxicity.

Loss of appetite, nausea, and vomiting are common toxic effects. Sinus bradycardia, atrioventricular block, ventricular extrasystoles, and sometimes ventricular tachycardia or atrial tachycardia with block also occur - especially in the presence of underlying conducting system defects or myocardial disease. Hypokalaemia predisposes to toxicity. Renal function is the most important determinant of digoxin dosage. Manifestations of toxicity can often be managed by discontinuing therapy and correcting hypokalaemia if appropriate.

10. CARDIOVASCULAR DRUGS

10.1 ANTIANGINAL

10.1.1. GLYCERYL TRINITRATEIndication

: Prophylaxis and treatment of angina; left ventricular failure.

Preparation/Route/Dose

: Sublingual tab : 0.5mg
Dose: 0.5mg - 1mg sublingual; repeated as required.

S.E.

: ^hTrobbing headache; flushing; dizziness; postural hypotension; tachycardia.

S.P.

: Hypotensive conditions

To be used in 8 weeks once the bottle is opened; dispense in glass containers.

Brand/Cost

ANGISED
(Burroughs Wellcome)

: Tab : 0.5mg: Rs 1.18 for 10

10.1.2 ISOSORBIDE DINITRATEIndication

: Prophylaxis and treatment of angina; left ventricular failure.

Preparation/Route/Dose

: Tab : 5mg, 10mg.
Cap : 20mg
Dose: 5mg sublingual, PRN
Oral: 10-30mg - QID
In left ventricular failure, 40-160mg - up to 240mg/day if required.

S.E.

: Throbbing headache;
flushing; dizziness;
postural hypotension;
tachycardia.

S.P.

: Hypotensive conditions

Brand/Cost

ISORDIL
(Geoffrey Manners)

: Tab : 10mg; Rs 9.38 per 100
Sublingual: Tab 5mg: Rs 4.96
for 100

SORBITRATE
(Nicholas)

: Tab : 10mg: Rs 9.43 for 100

CARDICAP T.R.
(Natco)

: Tab : 10mg: Rs 5.75 for 50

10.1.3

NIFEDIPINEIndication

: Prophylaxis and treatment
of anginas; hypertension;
Raynaud's phenomenon.

Preparation/Route/
Dose

: Cap : 10mg: Tab : 10mg
Cap : 20mg (Retard)
Dose: 10-20mg every 6 hours.
For immediate effect bite
into capsule and retain
liquid in mouth.

S.E.

: Headache; flushing; lethargy;
peripheral oedema; gum
hyperplasia.

S.P.

: Withdraw if ischaemic pain
occurs or existing pain
worsens shortly after
initiating treatment.
May inhibit labour.

Brand/CostNIFEDIPINE
(CMS-I): Tab : 5mg: Rs 80.00 for 1000
10mg: Rs 97.00 for 1000NICARDIA
(Unique Chem): Cap : 5mg: Rs 8.69 for 30
10mg: Rs 4.95 for 10
Tab : 10mg : Rs 6.30 for 10

10.1.4

OXYFEDRINEIndication

: Treatment of angina.

Preparation/Route/
Dose: Tab : 8mg
Dose: 16mg TID initially and
maintenance 8mg TID.C.I.: Aortic incompetence with
severe haemodynaemic disturbar
and subvalvular
aortic stenosis.S.P.

: Pregnancy

Brand/CostILDAMEN
(German Remedies): Tab : 8mg: Rs 7.70 for 100
24mg: Rs 51.72 for 30

10.1.5

PROPRANALOLIndication: Angina; hypertension; arrhythm
secondary prevention after
acute myocardial infarction;
migraine prophylaxis;
thyrotoxicosis.

Preparation/Route/
Dose

- : Tab : 10mg, 40mg.
- Inj : 1mg/ml ampoule
- Dose: Angina; 40mg 2-3 times daily (maintenance: 120-250mg daily)
- Hypertension: 40-80mg BD and at weekly intervals (maintenance: 160-320mg daily).
- Arrhythmias: 10-40mg, 3-4 times daily.
- Prophylaxis after myocardial infarction: 40mg QID for 2-3 days; then 80mg BD beginning 5-21 days after infarction.
- Migraine prophylaxis: 40mg 2-3 times/day.
- I.V. 1mg over 1 minute preceded by atropine sulphate; if necessary repeat at 2 min. interval. Max 15mg.

S.E.

- : Bradycardia; heart failure; bronchospasm; peripheral vasoconstriction; gastrointestinal disturbance.

S.P.

- : Late pregnancy; breast feeding. Avoid abrupt withdrawal in ischaemic heart disease. Reduce oral dose in liver disease and in renal impairment.

Brand/Cost

PROPRANOLOL
(CMS-I)

- : Tab : 10mg: Rs 80.00 for 1000
40mg: Rs 130.00 for 1000

INDERAL
(IEL)

: Tab : 10mg: Rs 1.42 for 10
40mg: Rs 4.12 for 10
80mg: Rs 6.50 for 10

10.1.6

VERAPAMIL

Indication

: Angina; hypertension;
supra ventricular arrhythmias.

Preparation/Route/ Dose

: Dragees 40mgs
Inj : 5mg/2ml amps.
Dose: 40-80mg TID

S.E.

: Nausea; vomiting; constipation;
headache.

Rarely reversible impairment
of liver function.

After I.V. - Hypotension;
bradycardia; heart block and
asystole.

S.P.

: 1st degree heart block.
I.V. in patients taking beta
blockers. Reduce dose in hepatic
impairment.

C.I.

: 2nd and 3rd degree heart blocks;
sick sinus syndrome; heart failure
atrial flutter or fibrillation
complicating Wolff-Parkinson-White
syndrome.

Brand/Cost

ISOPTIN
(Boehringer Knoll)

: Inj : 5m: 2ml amp: Rs 5.46 for
5 amps.

Dragees: 40mg: Rs 18.24 for
30 dragees

80mg: Rs 14.30 for 12
dragees

10.1.7

DILTIAZEM HClIndication

: Prophylaxis and treatment of angina.

Preparation/Route/
Dose

: Tab : 60mg, 30mg

Dose: 30mg QID before meals and at bed time.

Max. dose: 240mg/day
Not recommended for children.

C.I.

: Sick sinus syndrome;
2nd or 3rd degree heart block;
severe congestive cardiac failure.

S.P.

: Pregnancy; lactation; hypotension;
impaired hepatic or renal function.
Avoid abrupt withdrawal.
Concomitant use with beta blocker.

Brand/Cost

DILZEM
(Torrent)

: Tab : 30mg: Rs 12.00 for 10
60mg: Rs 23.00 for 10

DILGINA
(Kopran)

: Tab : 30mg: Rs 11.50 for 10
60mg: Rs 21.00 for 10

10.2.1

ATROPINEIndication

: Sinus bradycardia; symptomatic bradycardia.

Preparation/Route/
Dose etc.

: See Atropine

10.2.2

DISOPYRAMIDEIndication

: Ventricular arrhythmias esp.,
after myocardial infarction;
supraventricular arrhythmias;
arrhythmia associated with
Wolff-Parkinson-White syndrome.

<u>Preparation/Route/ Dose</u>	: Cap : 100mg Dose: 100mg Q.6.H. (300-800mg daily in divided doses)
<u>S.E.</u>	: Myocardial depression; hypotension; A.V. block; anticholinergic effects; dry mouth; blurred vision; urinary retention.
<u>S.P.</u>	: Glaucoma; heart failure; prostatic enlargement. Reduce dose in renal impairment.
<u>Brand/Cost</u>	
NORPACE (Searle)	: Cap : 100mg: Rs 16.63 for 10 150mg: Rs 24.07 for 10

10.2.3

ISOPRENALINE SULPHATE

<u>Indication</u>	: Heart block; severe bradycardia.
<u>Preparation/Route/ Dose</u>	: Inj : 2mg/ml in 2ml amp. Dose: 1 amp (4mg) given by infusion in 500ml normal saline or dextrose saline.
<u>S.E.</u>	: Tachycardia; arrhythmia; hypotension; sweating; tremor; headache.
<u>S.P.</u>	: Ischaemic heart disease; diabetes mellitus; hyperthyroidism
<u>Brand/Cost</u>	
ISOPRIN (Unichem)	: Inj : 2mg/ml, 2ml amp: Rs 7.88 for 10 amp.

10.2.4

PHENYTOIN : (See 5.)Indication : Cardiac arrhythmias.Preparation/Route/
Dose

: Amp: 50mg/ml - 2ml amp.

Dose: 5mg/kg I.V. very slowly
not exceeding 50mg/min.Tab: 100mg 1st day; 500mg
2nd to 4th day; thereafter
400mg.S.E. : HypotensionBrand/CostEPTOIN : Tab : 100mg : Rs 12.67 for 100
(Boots)EPSOLIN : Inj : 50mg/ml, 2ml amp: Rs 6.62
(Cadila) for 5 amps.

Tab: 100mg: Rs 18.00 for 100

DILANTIN : Cap : 0.1g: Rs 24.41 for 100
(P.D. & Co)

Suspension: 0.1g/4ml: Rs 9.00 for 114ml.

10.2.5

LIGNOCAINE HCl (LIDOCAINE HCl)Indication : Ventricular arrhythmias esp.,
after myocardial infarction.Preparation/Route/
Dose

: Inj : 20mg/ml - 5ml

2% inj: 50ml vial

Dose: I.V. 50-100mg as bolus;
repeated after 10-15 min & start
on infusion at 1-2mg/min.S.E. : Confusion; convulsion.S.P. : Lower dose in congestive cardiac
failure; hepatic failure and
following cardiac surgery.C.I. : Sinusatrial disorders; all grades
of A.V. block; severe myocardial
depression.

Brand/Cost

XYLOCARD
(Astra) : Inj: 21.3mg/ml, 5ml amp: Rs 9.90
for 5 amp.

GESICARD
(SG Pharma) : Inj: 20mg amp: Rs 26.76 for 25 amp.
Rs 4.73 for 50ml.

10.2.6

MEXILETINE HClIndication

: Ventricular arrhythmias, esp.,
after myocardial infarction.

Preparation/Route/
Dose

: Cap : 50mg, 150mg.
Inj : 25mg/ml amp. of 10ml each
Dose: oral: 200mg 3-4 times/day
inj : 100-250mg I.V. at
a rate of 25mg/min.
followed by infusion
of 250mg as a 0.1%
solution over 1 hr;
125mg/hr for 2 hours
and then 500microgram/
dose to be titrated to
patient's response.

S.E.

: Bradycardia; hypotension;
confusion; nystagmus; tremors.

C.I.

: Bradycardia; heart block.

Brand/Cost

MEXETIL
(German
Remedies) : Caps : 50mg: Rs 24.20 for 10
150mg: Rs 67.10 for 10
Inj : 10ml: Rs 75.20 for 5 amps.

10.2.7

PROPRANALOL

: See 10.1.5

10.2.8

PROCAINAMIDEIndication

: Ventricular arrhythmia esp.,
after myocardial infarction;
supraventricular arrhythmia.

Preparation/Route/
Dose

: Tab : 250mg

Inj : 100ml/ml--10ml vial

Dose: Adult: 1g initially
followed by total daily
dose of 50mg/kg at 3 hr
intervals.

I.V. (slow): 25-30mg/min.
with ECG monitoring, max: 1g

S.E.

: Nausea; diarrhoea; rashes;
fever; myocardial depression;
heart failure; lupus erythamatosus
like syndrome; agranulocytosis
after prolonged treatment.

S.P.

: Renal disease; asthma;
myasthenia gravis.

C.I.

: Heart block; heart failure;
hypotension.

Brand/Cost

PRONESTYL
(Sarabhai)

: Inj : 100mg/ml: Rs 21.65
per 10ml vial

Tab : 0.25g: Rs 10.85 for 25

10.2.9

QUINIDINE SULPHATEIndication

: Prevention of supraventricular
tachycardias; ventricular
arrhythmias.

Preparation/Route
Dose

: Tab : 200mg
Inj : 115mg/ml amp.
Dose: Adult: 200mg Q4h
Child: Test dose 2mg/kg
Therapeutic dose: 30mg/kg/day

S.E.

: As under Procainamide.
Thrombocytopaenia;
haemolytic anaemia rarely
granulomatous hepatitis.

C.I.

: Heart block.

Brand/Cost

QUINIDINE
SULPHATE
(Burroughs
Wellcome)

: Tab : 200mg: Rs 19.39 for 25

10.2.10

VERAPAMIL

10.3 ANTIHYPERTENSIVE DRUGS

10.3.1 CLONIDINE HCl

Indication

: Hypertension; migraine

Preparation/Route/
Dose

: Tab : 100mg, 150mg.

Dose: Start with $\frac{1}{2}$ to 1 tab/c
and increase by $\frac{1}{2}$ tab
every 2 days till desired
effect is achieved.

S.E.

: Dry mouth, sedation; depress
fluid retention; bradycardia
Raynaud's phenomenon.

C.I.

: History of depression.

S.P.: Must be withdrawn gradually
to avoid hypertensive crisis.Brand/CostCATAPRES
(German
Remedies): Tab : 150 microgram: Rs 15.00
for 100ARKAMIN
(Unichem)

: Tab : 100microgram: Rs 4.24 for 10

10.3.2

^A
HYDRLAZINEIndication: Moderate to severe hypertension;
in addition to a ^{beta}/_{block}ing drug
or diuretic; hypertensive crisis.Preparation/Route/
Dose

: Tab : 25mg

Dose: 25mg BD, increment to
max 50mg BD.S.E.: Trachycardia; fluid retention;
nausea; vomiting;
SLE like syndrome after long term
treatment with doses over 100mg/day
(or less in women)S.P.: Reduce dose in renal impairment.
Over rapid reduction in blood
pressure is seen occasionally even
with low parenteral doses.Brand/CostNEPRESOL
(Ciba)

: Tab : 25mg: Rs 9.07 for 100

10.3.3

HYDROCHLOROTHIAZIDE

Indication : Oedema; hypertension.

Preparation/Route/
Dose : Tab : 50mg

S.E. : Rashes; thrombocytopaenia;
impotence (reversible on withdrawal
of treatment)

Brand/Cost

ESIDREX : Tab : 50mg: Rs 6.31 for 100
(Ciba Hindustan)

10.3.4

LABETALOL HCl

Indication : Hypertension (including hypertension
in pregnancy), hypertension with
angina and hypertension following
acute myocardial infarction,
hypertensive crisis, controlled
hypotension in surgery.

Preparation/Route/
Dose : Tab : 50mg, 100mg, & 200mg
Dose: Initially 50mg BD with food
increased at intervals of
14 days; usually 200-400mg/d

S.E. : Postural hypotension; tiredness;
weakness; rashes; scalp tingling;
difficulty in micturition; epigast
pain; nausea, vomiting; rarely
lichenoid rash.

C.I. : Cardiogenic shock; severe
bradycardia; heart block.

S.P.

: Asthma; late pregnancy; breast feeding. Avoid abrupt withdrawal. Interferes with laboratory tests for catecholamines. Crosses placental barrier and may cause hypoglycaemia, hypotension and bradycardia in foetus.

Brand/Cost

NORMADATE
(Glindia)

: Tab : 50mg: Rs 7.55 for 10
100mg: Rs 15.00 for 10
200mg: Rs 29.04 for 10

10.3.5

GUANETHIDINEIndication

: Hypertension

Preparation/Route/
Dose

: Tab : 10mg, 25mg
Dose: 10mg daily may be increased by 10mg at weekly intervals up to max of 30mg.

S.E.

: Postural hypotension; failure of ejaculation; fluid retention; nasal congestion; diarrhoea.

S.P.

: Pregnancy.

C.I.

: Phaeochromocytoma.
Renal failure.

Brand/Cost

ISMELIN
(Hindustan Ciba)

: Tab : 10mg: Rs 15.00 for 100

10.3.6

ATENOLOLIndication

: Hypertension; angina;
arrythmias; early intervention
in acute myocardial infarction

Preparation/Route/
Dose

: Tab : 50mg, 100mg
Dose: 50-100mg daily as requir

S.E.

: As for PROPRANALOL

Brand/Cost

TENSIMIN
(Unique Chem)

: Tab : 50mg: Rs 8.13 for 10
100mg: Rs 13.20 for 10
Inj : 500mg/ml: Rs 3.99
for 10ml amp.
Tab : 25mg: Rs 5.32 for 10

BETACARD
(Torrent)

: Tab : 50mg: Rs 11.90 for 14
100mg: Rs 16.50 for 10

10.3.7

METHYL DOPAIndication

: Hypertension.

Preparation/Route/
Dose

: Tab : 250mg
Dose: 250mg 3 times daily
Gradually increased.
Max dose: 3g/day
Child: 30-40mg/kg/day.

S.E.

: Dry mouth, sedation,
depression, drowsiness,
diarrhoea, fluid retention,
failure of ejaculation,
haemolytic anaemia, SLE like
syndrome, liver damage.

S.P.

: Positive direct coombs test in 20% of patients. May affect blood cross matching.

C.I.

: History of depression. Acute liver disease. Pheochromocytoma.

Brand/Cost

ALDOMET
(Merind)

: Tab : 250mg: Rs 10.00 for 10

EMDOPA
(IDPL)

: Tab : 250mg: Rs 8.00 for 10
250mg: Rs 152.93 for 100

10.3.8 METAPROLOLIndication

: Hypertension; angina; arrhythmia; early intervention in acute myocardial infarction; migraine prophylaxis; thyrotoxicosis.

Preparation/Route/
Dose

: Tab : 50mg

Dose: Hypertension: 100mg daily, initially, maintenance 100-400mg daily in 1-2 doses.

Angina: 50-100mg 2-3 times daily

Arrhythmias: 50mg 2-3 times daily

Migraine prophylaxis: 100-200mg daily in divided doses.

Thyrotoxicosis: 50mg 4 times daily.

S.E./S.P./C.I.

: As for Propranolol.

Brand/Cost

METOLAR
(Cipla)

: Tab : 50mg: Rs 7.78 for 10
100mg: Rs 13.34 for 10

BETALOC
(Astra-IDL)

: Tab : 50mg: Rs 8.95 for 10
100mg: Rs 17.00 for 10

10.3.9 NIFEDIPINE See 10.1.310.3.10 RESERPINE + HYDRALAZINEIndication : Hypertension

Preparation/Route/
Dose : Tab : Reserpine 0.1mg
Hydralazine 10mg
Dose: 1 TID initially.
Maintenance 1-2 per day

S.E. : Dry mouth; nasal congestion;
sedation; depression; postural
hypertension; fluid retention;
bradycardia.

C.I. : History of depression; phaeochromocytoma;
peptic ulcer; Parkinson's disease.

S.P. : Late pregnancy; lactation.

Brand/Cost

ADELPHANE : Tab : Rs 23.89 for 250
(Ciba Hindustan)

PROPRANOLOL : (See 10.1.5)

INDERAL : (See 10.1.5)

10.3.11 DIAZOXIDE
(currently not
available in
the country)Indication : Hypertensive crisis; hypoglycaemia.

Preparation/Route/
Dose : Inj : 15mg/ml 20ml ampoule
Dose: I.V. rapid
boluses: 150-300mg,
repeated up to 3 times
in 24 hours

S.E.: Tachycardia; hyperglycaemia;
fluid retention.S.P./C.I.: Ischaemic heart disease;
pregnancy; labour; impaired renal
function.Brand/CostHYPERSTAT
(Searle)EUDEMINE
(Ash)10.3.12 SODIUM NITROPRUSSIDEIndication: Hypertensive crisis; controlled
hypotension in surgery; acute or
chronic heart failure.Preparation/Route/
Dose: Inj : 50mg vials (to be reconstituted)
Dose: By I.V. infusion 0.3-1 microgram/
kg/min. initially, then adjusted.
Usual range: 0.5-6 microgrames/kg/min.
Max. 8 microgram/kg/min.
Lower doses for patients already
on treatment with antihypertensives.S.E.: Headache; dizziness; nausea;
retching; abdominal pain;
perspiration; palpitation;
apprehension; retrosternal
discomfort--reduce infusion rate.

S.P.

: Hypothyroidism; severe renal impairment; elderly; impaired cerebral circulation; monitor plasma cyanide concentration.

C.I.

: Severe hepatic impairment; Vit B₁₂ deficiency; Leber's optic atrophy; compensatory hypertension.

Brand/Cost

SONIDE
(Gufic)

: Inj : 500mg/ml: Rs 17.93 per vial

10.3.13 CAPTOPRIL (ACE INHIBITOR)Indication

: Mild to moderate hypertension; as an adjunct to thiazide treatment. Severe hypertension, resistant to other treatment. Adjunctive treatment in congestive cardiac failure.

Preparation/Route/
Dose

: Tab : 25mg

Dose: Mild to moderate hypertension: initially, 12.5mg BD.
Usual maintenance: 25mg BD;
Max. 50mg BD.
Severe hypertension (with other antihypertensive)
Max. 50mg TID.
Heart failure with a diuretic: initially 6.25-12.5mg under close medical supervision.
Usual maintenance dose 25mg TID.

S.E.

: Persistent dry mouth; loss of taste; stomatosis; abdominal pain; rash; angio-oedema; hypotension; proteinuria; agranulocytosis; neutropaenia; hyperkalaemia (esp., in renal impairment)

C.I.

: Pregnancy.
Aortic stenosis.

S.P.

: First dose may cause severe hypotension within 3 hours esp., in patients on diuretics, low sodium diet or dialysis. Reduce dose or avoid in renal impairment. Check WBC and urine protein before and during treatment (In patients with renal impairment or autoimmune disease)
Avoid concurrent treatment with allopurinol, procainamide (Neutropaenia, Stevens Johnson syndrome) and potassium sparing diuretics (danger of hyperkalaemia).

Brand/Cost

ACETEN
(Woekhardt)

: Tab : 25mg: Rs 20.00 for 10

ANGIOPRIL
(Torrent)

: Tab : 25mg: Rs 18.50 for 10
50mg: Rs 35.00 for 10

10.3.14

TRIAMTERENE + BENZTHIAZIDEIndication

: Mild to moderate hypertension.
Oedema.

Preparation/Route/
Dose

: Tab : Triamterene 50mg
Benzthiazide 25mg
Dose: Hypertension: 1BD
Oedema - 2 after breakfast
1 after lunch
Maintenance: 1 or 2 on
alternate days.

S.E.

: Dry mouth; rashes; gastro-intestinal disturbance.

S.P.

: Pregnancy; diabetes mellitus;
cirrhosis of liver.
Monitor plasma urea and
potassium in elderly and in
renal impairment. Avoid
potassium supplements.

C.I.

: Hyperkalaemia.
Renal failure.

Brand/Cost

DYTIDE
(SK&F)

: Tab : Rs 6.37 for 12

10.4 CARDIAC GLYCOSIDES & ACE INHIBITERS

10.4.1

DIGOXINIndication

: Heart failure; supraventricular
arrhythmias esp., atrial
fibrillation.

Preparation/Route/
Dose

: Tab : 0.25mg

Inj : 0.5mg/2ml amp.

Elixir: 0.05mg/ml

Dose: by mouth rapid digitalisation
1-1.5mg in divided doses
(Q6h) over 24 hours.
Less urgent and maintenance
0.0125mg-0.25mg BD
Elderly 0.0125mg OD
I.V. digitalising dose of
0.15-1mg preferably as an
infusion (vol 50ml) over
2 or more hours followed by
normal maintenance therapy
IM not recommended, except
when other routes not
available.

Child: 0.04mg/kg; half the dose
stat and remainder in 2 dose
at 8 hourly intervals till
desired effect achieved.
Maintenance 0.01mg/kg.

S.E.

: Anorexia; nausea; vomiting;
visual disturbance; arrhythmias;
heart block.

S.P.

: Recent infarction; hypothyroidism.
Reduce dose in elderly and in
renal impairment. Avoid
hypokalaemia. Monitor electrolytes.

C.I.

: In the presence of A-V. block
in the absence of pace maker.
Great caution in patients with
sick sinus syndrome, if a
pacemaker is not present.

Brand/Cost

LANDOXIN
(Burroughs Wellcome)

: Tab : 0.25mg: Rs 0.97 for 10
Inj : 0.5mg/2ml: Rs 16.32 for 10 amp.
Elixir: 0.05mg/ml: Rs 2.69 for 30ml
Paed inj: 0.05mg/ml: Rs 8.93
for 10 amp.

CARDIOXIN
(Sandoz)

: Tab : 0.25mg: Rs 1.94 for 20

10.4.2

CAPTOPRIL

See 10.3.13.

10.4.3

ENALAPRIL

10.5 DRUGS USED IN SHOCK OR ANAPHYLAXIS

10.5.1 ADRENALINE
(EPINEPHRINE)Indication

: Acute allergic and anaphylactic reaction. Cardiac arrest.

Preparation/Route/
Dose

: 1 in 1000 - 1ml amp.

Dose: 0.5ml S.C. or IM - repeated if required.

By I.V. infusion 5-10ml
{0.5-1mg} of 1 in 10000
{diluted}.By intracardiac inj: 1-2ml
of 1 in 10,000.S.E.: Anxiety; tremor; tachycardia;
headache; cold extremities.
In over dosage, arrhythmias,
cerebral haemorrhage, pulmonary
oedema.S.P.: Ischaemic heart disease; diabetes
mellitus; hyperthyroidism;
hypertension.
Increased risk of arrhythmias with
antidepressants, digoxin or
quinidine.Brand/CostADRENALIN
(Bengal Immunity): Inj : 1 in 1000, 1ml amp: Rs 23.33
for 25 amp.10.5.2 DOPAMINE HClIndication: Cardiogenic shock in infarction
or cardiac surgery.
Septicaemic shock.

Preparation/Route/
Dose

: Inj : 200mg/5ml amp.

Dose: In cardiogenic shock:

2-5 microgram per kg/minute
(175-200 microgram/min.)

For septicaemic shock:

500-1200 microgram per minute.
(Dose titrated to blood
pressure response).

S.E.

: Nausea; vomiting; peripheral
vasoconstriction; hypotension;
hypertension; tachycardia.

C.I.

: Tachyarrhythmia.
Phaeochromocytoma.

S.P.

: Correct hypovolaemia first if
present.
Avoid extravasation (tissue
necrosis).

Brand/Cost

DOPAMINE
(TTK)

: Inj : 200mg/5ml: Rs 65.00 for 5 amp.

10.5.3

ISOPRENALINE

(See 10.2.3)

10.5.4

MEPHENTERMINE

Indication

: Treatment of hypotension.

Preparation/Route/
Dose

: Inj : 15mg/ml amp.

Dose: I.V. or I.M. range 15 to 60mg

Tab : 10mg

Dose: 2 tabs OD or BD

S.E. : Tachycardia; hypertension;
arrythmia; reduced renal blood flow.

C.I. : Hypertension

Brand/Cost

MEPHENTINE
(Wyeth) : Inj : 15mg/ml: Rs 2.21 for 1 amp.
30mg/ml: Rs 18.14 for 10ml vial
Tab : 10mg: Rs 10.94 for 20

10.5.5 NORADRENALINE

Indication : Acute hypotension. Cardiac arrest.

Preparation/Dose/
Route : Inj : 2ml/ml amp.
2-4mg diluted in 500ml normal
saline or 5% dextrose saline.
Infusion at rate of 0.5-1ml/min.
Solution to be rendered acidic
by addition of 0.1-1G of Vit.C

S.P. : Extravasation can cause tissue necrosis.
Severe hypertensive crises can occur.

Brand/Cost

NORDRIN
(Unichem) : Inj : 2mg/ml: Rs 6.54 for 6 amps.

10.6 PERIPHERAL VASODILATORS

10.6.1 CYCLANDELATE

Indication : Peripheral vascular disease.
Adjunct in management of senile
dementia.

Preparation/Dose
Route

: Tab : 200mg, 400mg

1200-1600mg/day in divided
doses.

Maintenance 400-800mg/day.

S.E.: Nausea; flushing; dizziness with
high doses.C.I.: Acute phase of cardiovascular
accidents.Brand/CostCYCLOSPASMOL
(Martin & Harris)

: Tab : 200mg: Rs 6.45 for 10

400mg: Rs 12.18 for 10

10.6.2

CO-DERGOCRINE MESYLATEIndication: Adjunct in management of
senile dementia.Preparation/Route/
Dose

: Tab : 1mg

Dose: 1mg TID

S.E.: Nausea; vomiting; flushing;
rashes; nasal congestion; postural
hypertensive patient.S.P.

: Severe bradycardia.

Brand/CostHYDERGINE
(Sandoz)

: Tab : 1mg: Rs 110.68 for 30

1.5mg:Rs 190.98 for 30

10.6.3 NICOTINIC ACID DERIVATIVES
(Nicofuranose)

<u>Indication</u>	: Peripheral vascular disease.
<u>Preparation/Route/ Dose</u>	: Enteric coated tab : 0.25g. 1-2g daily initially then 0.5g to 1g daily in divided doses.
<u>S.E.</u>	: As for 10.6.2
<u>S.P.</u>	: Diabetes mellitus
<u>Brand/Cost</u>	
COMPLAMINA (German Remedies)	: Inj : 300mg per 2ml: Rs 1.49 for am Tab : 150mg: Rs 2.08 for 10

10.6.4 ISOXSUPRINE HCl

<u>Indication</u>	: Cerebral and peripheral vascular disease; placental insufficiency; premature labour.
<u>Preparation/Route/ Dose</u>	: Tab : 10mgs, Inj : 5mg/ml 2 tabs 3-4 times/day gradual reduced with improvement. Inj. IM or IV
<u>S.E.</u>	: Flushing; tachycardia; nausea; vomiting; palpitation.
<u>C.I.</u>	: Recent arterial haemorrhage.
<u>Brand/Cost</u>	
DUVADILAN	: Inj : 10mg/2ml: Rs 7.14 for 6 amps. Tab: 10mg: Rs 15.06 for 50

10.6.5 OXPENTIFYLINE

Indication : Peripheral vascular disease.

Preparation/Route/
Dose : Tab : 400mg, 2-3 times daily

S.E. : Nausea; dizziness; flushing.

S.P. : Hypotension.

Brand/Cost

TRENTAL : Dragees : 400mg: Rs 145.00 for 30
(Hoechst)

PSYCHOACTIVE DRUGS

These are hypnotics, anxiolytics, anti-psychotics and anti-depressants.

Hypnotics include benzodiazepines, chloral hydrate chlor-methiazole and promethazine. Barbiturates are no longer recommended because of their poor therapeutic index. Before a hypnotic is prescribed the cause of the insomnia should be established and treated. They should NOT be indiscriminately prescribed because of their high potential for physical and psychological dependence. Transient and short term insomnia due to serious medical illness, sudden emotional upheaval or occupational factors (e.g., shift work) are treated with rapidly eliminated hypnotics for brief periods (few days to few weeks). Intermittent use with omission of some doses is desirable. They are of no use in chronic insomnia caused by underlying psychiatric disorders. Tolerance develops within 3 to 14 days of continuous use and withdrawal causes rebound insomnia. Benzodiazepines used as hypnotics include Lorazepam, Nitrazepam, Flurazepam and Flunitrazepam. Withdrawal phenomena are more common with the shorter acting drugs.

Anxiolytic benzodiazepines such as diazepam and chlordia-zepoxide can be effective in alleviating definite anxiety states. They should not be used to treat depressions, phobic, obsessional states or chronic psychosis. They are indicated for the short-term relief of severe, disabling anxiety that occurs alone or in association with insomnia, short-term psychosomatic, organic or psychotic illness. Side effects of benzodiazepines include drowsiness, ataxia, and paradoxical increase in hostility and

aggression. Betablockers (e.g., propranolol, atenolol) do not affect psychological symptoms such as worry and tension but they do reduce autonomic symptoms and are therefore indicated for patients with predominantly somatic symptoms. Meprobamate is less effective than the benzodiazepines, more hazardous in overdose and can also induce dependence.

Antipsychotic drugs - phenothiazines, butyrophenones and thioxanthenes - generally tranquillise without impairing consciousness and without causing paradoxical excitement. They are used long term, in schizophrenia and affective disorders and short-term for toxic delirium, agitated depression, acute behavioural disturbance and severe anxiety. Some antipsychotics (e.g., chlorpromazine, thioridazine) also have an anti-depressant action. Of the known side effects, extra-pyramidal, sedative and anticholinergic symptoms are the most frequent and troublesome. Hypotension occurs as a dose related effect especially in the elderly. The neuroleptic malignant syndrome consisting of hyperthermia, rigidity and fluctuating levels of consciousness is a rare and potentially fatal side effect. Selection of an anti-psychotic depends on the degree of sedation required and the patient's susceptibility to side effects. In general, chlorpromazine has pronounced sedative effect and moderate anti-cholinergic and extra pyramidal effects, while thioridazine has marked anti-cholinergic, moderate sedative but fewer extra pyramidal effects. Fluphenazine, butyrophenones and thioxanthenes have pronounced extrapyramidal effects but fewer anti-cholinergic and sedative effects.

Tricyclic and related anti-depressants are the drugs of choice in the treatment of moderate to severe endogenous depression unless it is so severe that immediate electroconvulsive therapy

is indicated. They are preferred to monoamine-oxidase inhibitors (MAOI) because they are more effective and do not show dangerous interactions with some foods and drugs that are characteristic of MAOI. Prescribing more than one anti-depressant and combinations with tranquilizers are not recommended. Improvement in sleep is usually the first benefit of the therapy but this may take 2-4 weeks to occur. Agitated and anxious patients tend to respond best to the more sedative compounds such as amitryptiline while withdrawn and apathetic patients benefit from the less sedative imipramine. These two drugs are relatively safe and effective but have more marked anti-cholinergic and cardiac side effects than the newer compounds (doxepin, mianserin, trazadone). Limited quantities of anti-depressant drugs should be prescribed at any one time since these drugs are very dangerous in overdosage.

Phobic patients, depressed patients with atypical, hypochondriacal or hysterical features and those refractory to other anti-depressants respond best to MAOIs. The drugs of choice are phenelzine and isocarboxazid which are safer and less stimulant than tranylcypromine which can cause hazardous stimulation. Other side effects include severe hypertensive reactions to tyramine containing foods (e.g. cheese) and hepatotoxicity. Tricyclic anti-depressants should not be used within 14 days of discontinuing an MAOI.

Lithium is the drug of choice for prophylaxis of manic-depressive psychosis. It can also be used in acute mania. Lithium toxicity (nausea, vomiting, diarrhoea, tremor, ataxia) can be avoided by staying within the therapeutic serum levels of 0.8 to 1.2 mEq/L.

The aim in treating should be to prevent occurrence of seizures by maintaining adequate plasma concentrations of ^{the} drugs. ~~in the body~~ The dose should be low to start with and the frequency should be as low as possible for better compliance. Concurrent therapy with several drugs should be avoided. It is best to control with a single antiepileptic drug. A second drug should only be added if seizures continue despite adequate plasma concentrations or toxic effects are seen. Another disadvantage of multiple therapy is ^{that} drug interactions occur between various antiepileptic drugs. Due to liver enzyme induction, phenobarbitone, phenytoin, primidone and carbamazepin may increase other's metabolism and reduce plasma concentrations.

Abrupt withdrawal of antiepileptics particularly the barbiturates and benzodiazepines should be avoided as this may precipitate severe rebound seizures. Reduction in dosage should be gradual and change over of drugs in the regimen should be cautiously done. Epileptic patients should be discouraged to drive motor vehicles. During pregnancy and breast feeding, care should be taken. Some of them, like phenytoin are teratogenic. Breast feeding is acceptable if taking normal doses with the possible exception of barbiturates.

PHENYTOIN is effective in tonic clonic and partial seizures. This has a narrow therapeutic index and small increase in dosage produces large rises in plasma concentration with acute toxic effects. Hence dose should be carefully adjusted, phenytoin causes coarse facies, acne, hirsutism, ~~and~~ gingival hyperplasia, nystagmus etc.

CARBAMAZEPINE is drug of choice for simple and complex partial seizures and tonic clonic seizures. It has a wider therapeutic index than phenytoin ^{and} fewer side effects than phenytoin or barbiturates. It causes dose related blurred vision, dizziness and unsteady gait.

PHENOBARBITONE is ^{an} effective drug but may produce rebound seizures on withdrawal. It could produce sedative effects in adults and behavioural disturbances and hyperaesthesia in children.

SODIUM VALPROATE is effective in controlling tonic clonic seizures, particularly primary generalised epilepsy. There have been reports on severe hepatic and pancreatic toxicity. These are rare.

CLONAZEPAM is occasionally used in tonic clonic or partial seizures. Sedative effects are prominent.

DIAZEPAM is used in status epilepticus and in convulsions due to poisoning. Febrile convulsions need only simple treatment like sponging and paracetamol. In prolonged ^{and} recurrent febrile convulsions, diazepam is the drug of choice given as a slow IV injection.

ANTI-PARKINSONISM DRUGS

In the drug therapy of parkinsonism, Levodopa improves all clinical manifestations. Concurrent administration of a decarboxylase inhibitor permits 75% reduction in the daily dose of levodopa. Combination levodopa and decarboxylase inhibitor is the treatment of choice for patients disabled by idiopathic Parkinson's disease e.g., Carbidopa. It is less effective in patients with post-encephalic Parkinsonism and should be avoided in drug induced Parkinsonism. Reserpine, Phenothiazine and Pyridoxine counter the effect of levodopa and should not be used along with it.

Anticholinergics may be used as first line drugs in mild cases, particularly with tremor and rigidity or as adjunctive therapy with levodopa. These are effective in drug induced and in post-encephalitic Parkinsonism. All patients with Parkinsonism do not require drug therapy. Anti-histamines are particularly useful in elderly patients with mild disease, who cannot tolerate anticholinergic drugs. Relatively inactive patients with minimal disease and no disability may be treated with physiotherapy alone. Amantidine is an useful alternative to anti-cholinergics in patients with mild disease. Patients with severe disease, who cannot tolerate levodopa and for those who get frequent "on and off phenomena", Bromocryptine can be used.

11. CENTRAL NERVOUS SYSTEM

11.1 SEDATIVES, HYPNATICS & ANXIOLYTICS

11.1.1 LORAZEPAMIndication

: Short term use in anxiety, insomnia and neurosis.

Preparation/Route/Dose

: Tab : 1mg; 2mg.
2-4mg in divided doses.
Insomnia: 1-4mg at bed time.

C.I.

: Hypersensitivity to benzodiazepines; respiratory depression; myasthaemia gravis.

S.P.

: Pregnancy and lactation; alcohol; hepatic disease, glaucoma, drowsiness.

Brand/Cost

LARPOSE
(Cipla)

: Tab : 1mg: Rs 1.87 for 10
2mg: Rs 3.29 for 10

ATVAN
(Wyeth)

: Tab : 1mg: Rs 2.94 for 10
2mg: Rs 3.92 for 10

11.1.2 DIAZEPAMIndication

: Short term use in anxiety, insomnia and neurosis.
Alcohol withdrawal; muscle spasm.

Preparation/Route/
Dose

: Tab : 2.5mg, 5mg, 10mg
Inj : 10mg/2ml amp.

2.5-30mg orally, daily
in divided doses.

0.15-0.25mg/kg IV
repeat Q 30 min. for seizures
and Q1-4 hours for tetanus.

C.I.

: Hypersensitivity to benzo-
diazepines; respiratory
depression; myasthenia gravis.

S.P.

: Pregnancy and lactation;
alcohol; hepatic disease,
glaucoma, drowsiness.
Inject slowly.

Brand/Cost

CALMPOSE
(Cipla)

: Tab : 2mg: Rs 1.56 for 10
5mg: Rs 3.28 for 10
10mg: Rs 4.46 for 10

Suspension: 2mg per 5ml:
Rs 8.27 for 60ml

Inj : 10mg per 2ml: Rs 21.44
for 10 amps.

VALIUM
(Roche)

: Tab : 2mg: Rs 2.25 for 10
5mg: Rs 3.29 for 10
10mg: Rs 5.49 for 10

Inj : 10mg per 2ml: Rs 13.32
for 6 amp.

11.1.3

NITRAZEPAM

Indication

: Insomnia

Preparation/Route/
Dose

: Tab or Caps : 5mg, 10mg
5 to 10mg at night.

C.I.

: Hypersensitivity to benzo-
diazepines; respiratory
depression; myasthenia gravis

S.P.

: Pregnancy and lactation;
alcohol; hepatic disease;
glaucoma; drowsiness.

Brand/Cost

NITRAVET
(Anglo French)

: Tab : 5mg: Rs 5.40 for 10

HYPNOTESE
(PCI)

: Caps : 5mg: Rs 3.75 for 10
10mg: Rs 5.06 for 10

11.2 ANTIDEPRESSANTS

11.2.1 IMIPRAMINEIndication

: Depression, nocturnal enuresis.

Dose

: Depression: 70-100mg at night.
Enuresis: upto 12 years: 25mg
at night, over 12 years: 50mg.

C.I.

: Concurrent administration of
MAO inhibitors; myocardial
infarction; acute narrow angle
glaucoma.

S.P.

: Children below 6 years; hypertension
and ischaemic heart disease; benign
prostatic hypertrophy;
hyperthyroidism.

Brand/CostDEPSONIL
(SG Pharma)

: Tab : 25mg: Rs 5.80 for 10

DEPSONIL-PM
(SG Pharma)

: Tab : 75mg: Rs 12.80 for 10

11.2.2

AMITRIPTYLINEIndication

: Depression and anxiety.

Preparation/Route/
Dose

: Tab : 10mg, 25mg

Dose: 25-50mg at night or
10-20mg thrice daily
Max. 150mg/day.C.I.: Concurrent administration of
MAO inhibitors; myocardial
infarction; acute narrow
angle glaucoma.S.P.: Children below 6 years;
ischaemic heart disease;
hypertension; hyperthyroidism.Brand/CostTRYPTOMER
(Merind): Tab : 10mg: Rs 3.55 for 10
25mg: Rs 6.39 for 10
75mg: Rs 13.78 for 10SAROTENA
(CFL Pharm): Tab : 10mg: Rs 2.65 for 10
25mg: Rs 4.58 for 10

11.2.3

MIANSERINIndication: Depression (less cardiovascular
effects, more sedation)

Preparation/Route/
Dose

: Tab : 10mg, 20mg, 30mg
Dose: 30-60mg in single
night dose or divided
doses.

C.I.

: Concurrent administration
of MAO inhibitors.

S.D.

: Occasionally causes bone
marrow suppression;
ischaemic heart disease;
concurrent alcohol or other
sedatives.

Brand/Cost

TETRADEP
(Torrent)

: Tab : 10mg: Rs 15.00 for 10
20mg: Rs 29.00 for 10
30mg: Rs 43.00 for 10

11.3 ANTIPSYCHOTICS

11.3.1 CHLORPROMAZINE

Indication

: Schizophrenia; sedation;
anaesthesia premedication.

Preparation/Dose

: Tab : 10mg, 25mg, 50mg; 100mg
Syrup: 5mg/5ml; 25mg/5ml
Inj : 50mg/2ml amp.
Dose: 25-100mg three times
daily.

C.I.

: Hypersensitivity to drug;
hepatic dysfunction; coma;
blood dyscrasia; concurrent
administration of amidopyrone
or phenylbutazone.

S.P.

: Parkinsonism; epilepsy;
pregnancy and lactation;
drowsiness; hypotension;
N.B: Extrapyrarnidal symptoms
common.

Brand/Cost

LARGACTIL
(May & Baker)

: Inj : 2ml amp: Rs 33.35 for 10 amps.
Syrup: 25mg/5ml : Rs 13.43 for 125ml
Tab : 10mg: Rs 2.66 for 10
25mg: Rs 4.15 for 10
100mg: Rs 8.06 for 10

11.3.2

TRIFLUOPERAZINEIndication

: Anxiety; schizophrenia and
psychosis.

Preparation/Dose

: Tab : 1mg; 5mg
Inj : 1mg/ml amp.
Dose: 1-2mg twice daily
5mg thrice daily.

C.I.

: Hypersensitivity to drug;
hepatic dysfunction; coma; blood
dyscrasia, concurrent administration
of amidopyrone or phenylbutazone.

S.P.

: Parkinsonism; epilepsy; pregnancy
and lactation; drowsiness; hypotension
N.B: Extrapyrarnidal symptoms common.

Brand/Cost

ESKAZINE
(Eskayef)

: Tab : 1mg: Rs 4.81 for 12
5mg: Rs 5.30 for 12
Inj : 1mg per ml: Rs 9.00 for 5 amps.

11.3.3

HALOPERIDOLIndication

: Anxiety; schizophrenia;
psychosis.

Preparation

: Tab : 0.25mg, 1.5mg, 5mg, 10mg
Syrup: 2mg/ml s
Inj : 5mg/ml amp.

Dose

: see literature.

C.I.

: Pregnancy and lactation;
coma.

S.P.

: Parkinsonism; epilepsy; liver
dysfunction; thyrotoxicosis.
N.B: Extrapyramidal symptoms common.

Brand/Cost

SERENACE
(Searle)

: Tab : 0.25mg: Rs 3.02 for 10
1.5mg: Rs 9.50 for 10
15mg: Rs 21.47 for 10
Inj : 5mg per ml: Rs 19.16 for 5 amp.
Liquid: 2mg/ml: Rs 20.56 for 30ml

11.3.4

FLUPHENAZINEIndication

: Schizophrenia; psychosis
(long acting)

Preparation/Dose

: Tab : 1mg
Inj : 25mg/ml
Dose: 1-10mg daily PO
25mg I.M. every 2-4 weeks

C.I.

: Renal or hepatic dysfunction.

S.P.

: Pregnancy, lactation; convulsive
disorders; extra-pyramidal symptoms
common.

Brand/CostANATENSOL
(Sarabhai): Tab : 1mg: Rs 2.45 for 10
Inj : 25mg per ml: Rs 12.07 for 1ml
vial11.3.5 LITHIUM CARBONATEIndication

: Mania; manic depressive psychosis.

Preparation/Dose: Tab & Caps : 150mg, 300mg
Dose: 600-900mg daily. Ideally
monitor serum levels to
0.7 - 1.0 mEq/litreC.I.: Renal or cardiac disease;
pregnancy and lactation;
hypothyroidism.S.P.: Concomittent use of diuretics;
hyponatraemia, monitor
electrolytes and thyroid function.Brand/CostLITHOCARB
(Merck): Caps: 150mg: Rs 17.81 for 50
300mg: Rs 14.27 for 30LICAB
(Torrent)

: Tab : 300mg: Rs 4.50 for 10

11.4 ANTIEPILEPTICS

11.4.1 CARBAMAZEPINEPreparation/Route/
Dose: Tab : 200mg
Dose: 600-1200mg/day--adult in
divided doses.
Child: 20-30mg/kg/24 hours
in divided doses.

S.E.

: Gastro-intestinal disturbances;
dizziness; drowsiness; diplopia;
rash; leucopaenia.

C.I.

: Previous sensitivity; atrio-
ventricular conduction abnormalities.
Patients on MAO treatment or within
2 weeks of such treatment.

Brand/Cost

MAZETOL
(S.G. Pharma)

: Tabs : Rs 172.86 for 100

CARBAMAZEPINE
(Curemed)

: Tab : 200mg: Rs 175.00 for 100

11.4.2

DIAZEPAM

Preparation/Route/
Dose

: Inj : 5mg/ml - 2ml amp.
Dose: 10-20mg at a rate of 2.5mg
per 30 second repeated if
necessary after 30-60 minutes.
May be followed by slow I.V.
infusion to a max. of 3mg/kg.
Child: 0.2mg/kg/dose slow I.V.

S.E.

: Respiratory depression.

C.I.

: Benzodiazepine sensitivity;
myasthenia gravis; acute narrow
angle glaucoma.

Brand/Cost

VALIUM / CALMPOSE
(Roche) (Ranbaxy)

: (See 1.1.7)

11.4.3

ETHOSUXIMIDERoute/Preparation/
Dose

: Syrup: 250mg/5ml
Dose: Child : 20-40mg/kg/day

S.E.

: Gastro-intestinal disturbances;
dizziness; drowsiness; ataxia;
psychotic states; rashes;
leucopenia; agranulocytosis
rarely.

C.I.

: Porphyria.

Brand/Cost

ZARONTIN
(Parke-Davis)

: Rs 14.11 for 114ml.

11.4.4

PHENOBARBITALPreparation/Route/
Dose

: Tab : 30mg, 60mg
Inj : 200mg/ml ampoule
Dose: orally 30-180mg at night
Child: 5-8mg/kg daily.

S.E.

: Drowsiness; lethargy;
mental depression; ataxia;
allergic skin reactions;
restlessness; confusion in
elderly; hyperkinesia in
children; megaloblastic anaemia

S.P.

: Elderly; children; pregnancy
breast feeding. May cause
dependence.

C.I.

: Porphyria.

Brand/Cost

GARDENAL SODIUM : Tab : 30mg: Rs 1.20 for 10
(May & Baker) 60mg: Rs 1.27 for 10

11.4.5 PHENYTOIN SODIUMPreparation/Route/
Dose

: Tab : 100mg
Dose: 100mg TID before meals.
Child: 3-8mg/kg in divided doses.
Suspension: 100mg/4ml
Inj : 100mg/2ml, 5-10mg/kg IV.
In status epilepticus at rate
upto a maximum of 1g followed
by maintenance dose.

S.E.

: Nausea; vomiting; mental confusion;
dizziness; headache; tremor; insomnia;
ataxia; slurred speech; myasthenia;
blurred vision; lymphadenopathy;
gingival hypertrophy.

C.I.

: Fever; hepatitis; lupus erythematosus.

Brand/Cost

DILANTIN SODIUM : Cap : Rs 24.41 for 100
(P.D. & Co.) Suspension: Rs 9.00 for 114ml

EPTOIN : Tab : Rs 12.67 for 100
(Boots)

EPSOLIN : Inj : Rs 6.62 for 5 amps.
(Cadila) Tab : Rs 18.00 for 100

11.4.6

PRIMIDONEPreparation/Route/
Dose

: Tab : 250mg

Dose: 1 tab at bed time

Dose range up to 1g/day.

S.E.

: As under Phenobarbitone

Brand/CostMYSOLINE
(IEL)

: Tab : Rs 5.83 for 100

11.4.7

SODIUM VALPROATERoute/Preparation/
Dose

: Tab : 200mg

Dose: Adult: 30-60mg/kg daily

Child: 20-30mg/kg daily.

S.E.: Gastro-intestinal irritation;
increased appetite and weight
gain; transient hair loss;
oedema; thrombocytopaenia;
impaired hepatic function;
rarely pancreatitis.C.I.

: Active liver disease

S.P.: Children; history of liver
disease; pregnancy; breast feedingBrand/CostSODIUM VALPROATE
(Reckitt Colman)

: Tab : 200mg: Rs 13.00 for 12

(Torrent)

: Tab : 200mg: Rs 7.00 for 10

11.5 ANTIMIGRAINE DRUGS

11.5.1 ERGOTAMINE TARTARATERoute/Preparation/
Dose

: Tab : 2mg:

Dose: 2mg initially, followed
by 1mg every 30 minutes
(range 1-5mg)S.E.

: Headache; nausea; vomiting.

C.I.: Pregnancy; peripheral vascular
disease; sepsis; breast feeding.S.P.: Renal, hepatic and cardiovascular
disease.Brand/CostCAFERGOT
(Sandoz)GYNERGEN
(Sandoz): Inj : Rs 7.47 for 6 amps.
Tab : Rs 7.22 for 1511.5.2 ERGOT PREPARATAPreparation/Route/
Dose

: Tab : prepared ergot 270mg

Brand/CostERBOLIN
(Glindia)

: Tab : Rs 50.65 for 1000

11.5.3 PROPRANOLOL

: See 10.1.5

11.5.4 CLONIDINE

: See 10.3.1

11.6 ANTIPARKINSONIAN DRUGS

11.6.1 DOPAMINERGIC DRUGS11.6.1.1 AMANTADINE

Preparation/Route/
Dose

: Cap : 100mg
Dose: 100mg BD

. S.E.

: Nervousness; insomnia;
gastro-intestinal disturbances;
skin discolouration; peripheral
oedema; rarely leucopenia.

C.I.

: Epilepsy
Gastric ulcer.

Brand/Cost

AMANTREL
(Cipla)

: Cap : 100mg: Rs 18.22 for 10

11.6.1.2 BROMOCRIPTINE

Preparation/Route/
Dose

: Tab : 2.5mg

Dose: Start with $\frac{1}{2}$ tab/day with
meals; increase by 1 tab
every 2-4 weeks till
maximum therapeutic effect
achieved.

S.E.

: Nausea; vomiting; constipation;
postural hypotension; dyskinesia
dry mouth; leg cramps; digital
vasospasm.

S.P.

: Monitor for pituitary enlargement. Severe cardiovascular disease. Monitor for peptic ulceration. Psychotic disorders.

C.I.

: Sensitivity to ergot alkaloids.

Brand/Cost

PROCTINAL
(Biddle Sawyer)

: Tab : 2.5mg : Rs 222.00 for 30

11.6.1.3

LEVODOPAPreparation/Route/
Dose

: Tab : 500mg

Dose: Initially 250mg to 1g/day in divided doses. May be increased up to 8g/day.

S.E.

: Gastro-intestinal disturbance; psychiatric symptoms; tachycardia; postural hypotension.

S.P.

: Pulmonary disease; peptic ulcer; glaucoma; cardiovascular disease; hepatic and renal disease. Patients taking phenothiazine.

Brand/Cost

LEVOPA
(Carter Wallace)

: Tab : 500mg: Rs 19.03 for 10

11.6.1.4

LEVODOPA + CARBIDOPARoute/Preparation/
Dose

: Tab : Levadopa 250mg
Carbidopa 25mg

Dose: Tab 1 BD gradually increased to 1 TID.

S.E./S.P./C.I.

As under LEVADOPA

Brand/CostSINEMET-110
(Merind): Levodopa 100mg
Carbidopa 10mg
: 201.80 for 100

SINEMET-PLUS

: Levodopa 100mg
Carbidopa 25mg
: 421.80 for 100

SINEMET-275

: Levodopa 250mg
Carbidopa 25mg
: 505.75 for 100

11.6.2 ANTICHOLINERGICS

11.6.2.1

PROCYCLIDINE HClPreparation/Route/
Dose

: Tab : 2.5mg, 5mg

Dose: Initially 2.5mg TID after
food. Increase by 2.5mg
daily; usual max. dose
30mg/dayS.E.: Dry mouth; gastro-intestinal
disturbances; blurred vision;
psychiatric disturbance.S.P.: Urinary retention; glaucoma;
cardiovascular disease; hepatic
and renal dysfunction; pregnancyBrand/CostKEMADRIN
(B.W.): Tab : 2.5mg: Rs 2.15 for 10
5mg: Rs 4.19 for 10

11.6.2.2. TRIHXYPHENIDYLRoute/Preparation/
Dose

: Tab : 2mg

Dose: 1mg on 1st day; increase
by 2mg every 5 days up to
a total of 10mg/day.S.E.

: As for Procyclidine

S.P.

: Glaucoma

Brand/CostPACITANE
(Lederle)

: Tab : 2mg: Rs 3.10 for 10

12. DRUG USED IN DERMATOLOGY

12.1 ANTIFUNGAL & ANTIINFECTIVE

12.1.1 WHITFIELD OINTMENT

Indication : Fungal infection of feet and hands.

Use : Local application twice daily.

C.I. : Groins and moist areas.

Preparation : Benzoic acid 6%
Salicylic acid 3%

Brand/Cost

WHITFIELD OINT (Jilic Chem) : Rs 2.90 for 15g

WHITFIELD OINT (Makers) : Rs 30.00 for 450g

12.1.2 MICONAZOLE

Indication : Fungal infection.

Use : Local application thrice daily.

C.I. : Avoid contact with eyes.

S.P. : Pregnancy and lactation.

Preparation : 2% ointment and lotion.

Brand/Cost

MICO GEL (Cipla) : Cream: Rs 3.45 for 5g

ZOLE (Gufic) : Oint.: Rs 3.19 for 5g
Lotion: Rs 7.60 for 15ml

182 01746
PKH00

12.1.3

NYSTATINIndication

: Cutaneous and muco-cutaneous candidiasis.

Use

: Local application thrice daily.

Preparation

: Vaginal tab : 100,000 U
 Vaginal Oint: 100,000 U/g
 Oral: 500,000 U tab

Brand/Cost

MYCOSTATIN
 (Sarabhai)

: Tab : 500,000 U : Rs 24.13 for 12
 Vag. tab : 100,000 U : Rs 10.86 for 12
 Oint: 100,000 U per gram: Rs 6.67 for 10g

12.1.4

GRISEOFULVINIndication

: Fungal infection of skin, nails and scalp.

Use

: 500-1000mg daily with meals in divided doses. Children 10mg/kg/day.

C.I.

: Liver disease, pregnancy, moniliasis.

S.P.

: Monitor liver functions.

Preparation

: 125mg tabs.

Brand/Cost

GRISOVIN FP
 (Glindia)

: Tab : Rs 4.49 for 10

IDIFULVIN
 (IDPL)

: Tab : Rs 4.12 for 10

12.1.5

KETOCONAZOLEIndication

: Fungal infection especially vaginitis and with systemic involvement.

<u>Use</u>	: 200-400mg daily.
<u>C.I.</u>	: Liver disease, pregnancy and lactation, children below 12 years.
<u>S.P.</u>	: Monitor liver functions.
<u>Preparation</u>	: Tab : 200mg
<u>Brand/Cost</u>	
FUNGICIDE (Torrent)	: Tab : 200mg: Rs 65.00 for 10

12.1.6 GENTIAN VIOLET

<u>Indication</u>	: Impetigo and furuncles
<u>Use</u>	: Local application twice daily.
<u>Preparation</u>	: 1% solution.

12.1.7 POVIDONE IODINE
(See 15.9.2)

<u>Indication</u>	: Abrasions, ulcers and superficial infection of skin.
<u>Use</u>	: Local application twice daily.
<u>C.I.</u>	: Iodine sensitivity.
<u>Preparation</u>	: 5% ointment, solution.
<u>Brand/Cost</u>	
BETADINE (Wockhardt)	: Oint: 5%: Rs 9.96 for 25g Solution: 5% : Rs 17.59 for 100ml.
PIO_DIN (Croydon)	: Oint: 10%: Rs 8.73 for 10g Solution: 10%: Rs 9.38 for 50ml

12.1.8

NEOMYCIN-BACITRACIN

<u>Indication</u>	: Abrasions, ulcers and superficial infections of skin.
<u>Use</u>	: Local application twice daily.
<u>S.P.</u>	: Nephro/oto toxicity is possible especially if used with systemine neomycin or aminoglycosides.
<u>Preparation</u>	: Polymixin 5000 U + Neomycin 3400 U + Bacitracin 4000 as powder and ointment.
<u>Brand/Cost</u>	
NEOSPORIN (Wellcome)	: Oint: Rs 3.29 for 5mg

12.1.9

SOFRAMYCIN

<u>Indication</u>	: Abrasions, ulcers and superficial infections of skin.
<u>Use</u>	: Local application twice daily.
<u>S.P.</u>	: Hypersensitivity
<u>Preparation</u>	: 1% cream.
<u>Brand/Cost</u>	
SOFRAMYCIN-Skin (Roussel)	: Cream: 1%: Rs 5.24 for 15g

12.2 ANTI-INFLAMMATORY DRUGS (TOPICAL)

12.2.1 BETAMETHASONEIndication

: Eczema, psoriasis, lichen simplex and planus, contact dermatitis, seborrheic dermatitis.

Use

: Local application 2-3 times daily

C.I.

: Acne, scabies, fungus or bacterial disease, unless associated with effective anti-infective drug.

S.P.

: Sudden withdrawal can lead to flare up of lesions. Prolonged use can lead to adrenal suppression.

Preparation

: 0.12% cream, plain or with neomycin or chionoform.

Brand/Cost

BETNOVATE : Betnovate oint: Rs 10.22 for 15g

BETNOVATE N : Betnovate C-Oint: Rs 10.92 for 15

BETNOVATE C
(Glindia) : Betnovate N-cream:Rs 10.92 for 1512.2.2 FLUOCINOLONEIndication

: As for 12.2.1

Use/C.I./S.P.

: As for 12.2.1

High potency preparation to be used sparingly.

Preparation

: 0.025, 0.1% cream and lotion, plain or with neomycin or chionoform.

Brand/Cost

FLUCORT	: Oint: Rs 4.14 for 5g
FLUCORT N	: Oint: Rs 8.43 for 15g
FLUCORT C (Lyka)	: Oint: Rs 7.40 for 15g

12.3 KERATOLYTICS & ANTI-ACNE PREPARATIONS

12.3.1 SALICYLIC ACID

<u>Indication</u>	: Psoriasis, palmar or plantar hyperkeratosis (corns) and feet fissures.
<u>Use</u>	: Local application 2-3 times daily.
<u>C.I.</u>	: Eyes and mucous membranes.
<u>Preparation</u>	: 5%, 10% ointment 16.5% liquid.

12.3.2 DITHRANOL

<u>Indication/use</u>	: As for 12.3.1
<u>C.I.</u>	: Eyes and mucous membranes. Acute or pustular psoriasis.

Brand/Cost

DERBIN SKIN (Allenburys)	: Oint: Rs 8.65 for 25g
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12.3.3 TRETINOIN

<u>Indication</u>	: Acne
<u>Use</u>	: Local application 2 times daily.

<u>C.I.</u>	: Acute dermatitis, cuts and abrasions.
<u>S.P.</u>	: Avoid eyes and mucous membranes. Avoid sunlight.
<u>Preparation</u>	: 0.05% cream.
<u>Brand/Cost</u>	
ENDYNIA (German Remedies)	: Cream : 50mg per 100g: Rs 12.00 for 20g.

12.4. SOOTHING AND PROTECTIVE DRUGS

12.4.1 CALAMINE

<u>Indication</u>	: Symptomatic relief of pruritic lesions.
<u>Use</u>	: Local application as needed.
<u>Preparation</u>	: Calamine 8%
<u>Brand/Cost</u>	
CALAMINE LOTION (Roots)	: Rs 5.71 for 110ml.
BELLE CREAM (Bell Pharma)	: Oint: 2%: Rs 6.75 for 20g.

12.4.2 ZINC OXIDE

<u>Indication</u>	: Soothing agent and sunscreen.
<u>Use</u>	: Local application as needed.

12.4.3 DIMETHICONE

<u>Indication</u>	: Soothing agent, barrier cream for napkin rash, intertrigo.
<u>Use</u>	: Local application as needed.
<u>Preparation</u>	: Dimethicone 20% with Zinc oxide and calamine.

Brand/Cost

SILODERM OINTMENT : Oint: Rs 6.80 for 20g.
(Neo Pharma)

12.5 SCABICIDES & PEDICULOCIDES

12.5.1 BENZYL BENZOATE

Indication : Scabies and pediculosis.

Use : Apply uniformly over the body
from neck down after a hot bath;
2nd application within 5 days.

S.P. : Prevent contact with eyes.
Apply from neck down only.

Preparation : 25% emulsion.

Brand/Cost

ASCABIOL : Liquid emulsion: 25%: Rs4.67 for 50ml.
(May & Baker)

12.5.2 GAMMA BENZENE

Indication : Scabies and pediculosis.

Use : Apply uniformly over the body
from neck down after a hot bath;
2nd application within 5 days.

S.P. : Prevent contact with eyes.
Apply from neck down only.

Preparation : 1% lotion or ointment.

Brand/Cost

GAB : Lotion: Rs 3.90 per 25ml
(Gufic) Oint: Rs 3.00 for 15g.

12.6 MISCELLANEOUS.

12.6.1

AMMOIDINEIndication

: Depigmented lesions.

Use

: 0.7mg/kg orally followed by exposure of lesion to sunlight for 2-5 minutes initially-- also ointment for local application

C.I.: Pregnancy and liver disease.
Children below 12 years.S.P.

: Avoid eyelids, lips and genitalia.

Preparation: Tab : 10mg
Oint: 0.75%Brand/CostMELANOCYL
(Franco-Indian): Oint: Rs 12.40 for 25g
Solution: Rs 12.62 for 25ml
Tab : 10mg: Rs 16.82 for 40

12.6.2

PSORALEN

Indication

: Vitiligo

Use

: 0.6-0.7mg/kg orally or local application followed by graded exposure to sunlight.

C.I.: Porphyria, SLE, leukoderma associated with leprosy.
Pregnancy.S.P.: Hypertension and heart disease.
Overexposure to sunlight.

Preparation

: Tab : 5mg, 10mg
Oint & Solution: 0.25%

Brand/Cost

PSORLINE
(Franco Indian)

: Oint: 0.25%: Rs 4.46 for 15g.
Solution: 0.25%: Rs 4.73 for 10ml
Tab : 5mg: Rs 7.57 for 24

12.6.3 PARA AMINO BENZOIC ACID (PABA)

Indication

: Sunscreen agent, often used
with psoralens.

Use

: Local application before
exposure to sunlight or
UV light.

Preparation

: 10% cream.

Brand/Cost

PARAMINOL
(Franco Indian)

: Cream: 10%: Rs 5.42 for 25g.

14. DISINFECTANTS.

14.1 ALCOHOL
(Industrial Methylated spirit)

Indication : Skin preparation before injection.

S.P. : Flammable. Avoid broken skin.

Brand/Cost

SURGICAL SPIRIT

14.2 CETRIMIDE

Indication : Skin disinfection.
Soap or shampoo substitute in acne, skin infections and seborrhoea of scalp.
Active against gram positive but not gram negative bacilli.

Preparation/Dose : Solution : 500ml.

S.E. : Skin irritation and occasional sensitivation.

S.P. : Avoid contact with eyes.
Avoid use in body cavities.

Brand/Cost

CETAVALON : Liquid: 0.5%: Rs 17.25 for 500ml.
(IEL) 20% w/w: Rs 11.09 for 10

14.3 CHLORHEXIDINE

Indication

: Skin disinfection such as pre-operative skin preparation, obstetric and wound cleansing, bladder irritation.

Active against gram +ve but not so effective against gram -ve bacilli.

Brand/Cost

HIBITANE
(IEL)

: Liquid: 5% w/v: Rs 81.13 for 1 ltr.

HIBISCRUB
(IEL)

: Liquid: 4% w/v: Rs 111.10 for 500ml.

14.4 COMBINATION OF CETRIMIDE & CHLORHEXIDINE

Preparation/Dose

: Chlorhexidine 7.5%
Cetrimide 15%

S.P.

: Use recommended dilutions.

Brand/Cost

SAVLON
(IEL)

: Hospital concentrate:
Liquid: Rs 88.59 per litre
Liquid antiseptic: Rs 4.73 for 100ml.

14.5 CHLORINATED SOLUTIONS

CHLORINATED LIME & BORIC ACID

Indication

: Skin disinfection particularly wound and ulcer cleaning.

S.P. : Bleaches fabric; solution may be irritant. Solution must be freshly prepared.

Brand : Eusol; Dakin's solution

14.6 HYDROGEN PEROXIDE

Indication : Skin disinfection, particularly cleansing and deodorising wounds and ulcers.

S.P. : Bleaches fabric; solution above 6% should be diluted. Protect from light. Store in closed, well filled containers.

14.7 IODINE COMPOUNDS

14.7.1 IODINE SOLUTION (Weak)

Indication : Skin disinfection; soap or shampoo substitute in acne, skin infection and seborrhoea of scalp.
Preoperative skin preparation.

Preparation/Dose : As a 1% solution in 70% alcohol for preoperative skin preparation.

14.7.2 PROVIDONE IODINE

Indication : Boils, furuncles, impetigo, sycosis barbae, otitis externa, secondary infection of burns, wound fungal infections, tinea pedis, cutaneous candidiasis.

Preparation/Dose

: Oint: 5%

Solution: 5%

Brand/CostBETADINE
(Wochardt)

: Solution: 5%: Rs 17.59 for 100ml

Surgical scrub: 7.5%: Rs 90.80
for 500ml.

14.7.3

IODOPHOR

Indication

: Hand and skin disinfection.

Brand/CostPOLYSAN
(Polypharm)

15. DIURETICS

THIAZIDES are used to relieve oedema due to heart failure. They are also used in lower doses to reduce blood pressure. The more potent 'loop' diuretics such as FRUSEMIDE or BUMETANIDE are used in patients with pulmonary oedema due to left ventricular failure and in patients with long standing heart failure who no longer respond to the thiazides. Diuretics are usually administered early in the day so that the diuresis does not interfere with sleep. Hypokalaemia may occur with both thiazide and loop diuretics. Often the use of potassium sparing diuretics like spironolactone, triamterene, and amiloride avoids the need to take potassium supplements.

15. DIURETICS

15.1 AMILORIDE + HYDROCHLOROTHIAZIDE

Indication : Oedema. Potassium conservation with thiazide and loop diuretic. Mild to moderate hypertension.

Preparation/Route/Dose : Tab : Amiloride 5mg
Hydrochlorothiazide 50mg.
Dose: 1-2 tab a day.

S.E. : Rashes; mental confusion.

S.P./C.I. : Pregnancy; diabetes mellitus; hepatic cirrhosis.

Brand/Cost

BIDURET : Tab : 3.40 for 10
(Biddle Sawyer)

KSPAR : Tab : 60.80 for 100.
(Ebers)

15.2 ACETAZOLAMIDE

Indication : Treatment of glaucoma.

Preparation/Route/Dose : Tab : 250mg
Dose: 250mg: 1g per day in divided doses.

S.E. : Paraesthesia; hypokalaemia; loss of appetite; depression.

S.P. : Avoid in renal impairment.

	<u>Brand/Cost</u>	:	
	DIAMOX (Lederle)	:	Tab : 250mg: Rs 5.06 for 10
15.3	<u>CHLORTHALIDONE</u>		
	<u>Indication</u>	:	Oedema; hypertension; diabetes insipidus.
	<u>Preparation/Dose/ Route</u>	:	Tab : 100mg Dose: 1-2 tabs 3 times a week.
	<u>S.E.</u>	:	Rashes; thrombocytopaenia; impotence.
	<u>C.I.</u>	:	Renal failure; hypercalcaemia; Addison's disease.
	<u>S.P.</u>	:	Severe ischaemic heart disease; cerebral atherosclerosis.
	<u>Brand/Cost</u>		
	HYTHALTON (SG Pharma)	:	Tab : 100mg: Rs 9.33 for 10
15.4	<u>HYDROCHLOROTHIAZIDE</u>	:	See 12.3.3
15.5	FRUSEMIDE		
	<u>Indication</u>	:	Oedema; oliguria due to renal failure.
	<u>Preparation/Route/ Dose</u>	:	Tab : 40mg Inj : 10mg/ml--2ml amps. Dose: 1 tab a day increased as desired.

Inj : 20mg-40mg I.M. or slow I.V.
Child: 1-3mg/kg daily.
In oliguria initially 250mg daily, if necessary larger doses increasing in steps of 250mg may be given every 4-6 hours to a maximum of a single dose of 2g. By intravenous infusion in oliguria 0.25-1g at a rate not more than 4mg/minute.

S.E. : Rashes; tinnitus and deafness in impaired renal function.

C.I. : Liver cirrhosis.

S.P. : Pregnancy; hypokalaemia
and hyponatraemia; aggravates
diabetes and gout; liver failure;
prostatism.

Brand/Cost

LASIX : Inj : 20mg per 2ml amp:
(Hoechst) Rs 11.87 for 10 amp.
Tab : 40mg: Rs 41.15 for 250

15.6

BUMETANIDE

Indication : Oedema; oliguria due to renal failure.

Preparation/Route/
Dose : Tab : 1mg
Dose: 1-4mg/day. Max: 15mg/day
Child: 0.05mg/kg/day.

S.E./S.P./C.I. : See under Frusemide (15.5)

Brand/Cost

BUMET : Tab : 1mg: Rs 4.22 for 10
(Montari)

15.7

MANNITOL

Indication : Forced diuresis; cerebral oedema;
increased intraocular tension.

Preparation/
Dose/Route

: 20% infusion: 350ml
Dose: 100-200ml over 20-30 min. and
repeated as required.

S.E. : Chills; fever.

S.P. : Extravasation, causes inflammation
and thrombophlebitis.

C.I. : Congestive cardiac failure;
pulmonary oedema.

Brand/Cost

MANNITOL : Inj : 20% 0.2g/ml: Rs 16.55 for 350ml
(Unichem)

15.8

SPIRONOLACTONE

Indication : Oedema in cirrhosis liver,
nephrotic syndrome; congestive
cardiac failure; potentiation of
thiazide and loop diuretics;
primary aldosteronism.

Preparation/Route/
Dose

: Tab : 250mg
Dose: 100-200mg daily
Max 400mg/day
Child: 3mg/kg in divided
doses.

S.E.

: Gastro-intestinal disturbances;
gynaecomastia.

S.P.

: Pregnancy

C.I.

: Hyperkalaemia; renal failure.

Brand/Cost

ALDACTONE
(Searle)

: Tab : 25mg: 11.66 for 10
100mg: Rs 44.10 for 10

15.9 TRIAMTERENE + BENZTHIAZIDE :

16. EAR, NOSE and THROAT

16.1 EAR

16.1.1 CHLORAMPHENICOL

<u>Indication</u>	: Otitis externa, media and after mastoid surgery.
<u>Preparation</u>	: Drops: 1%, 5%
<u>Dose</u>	: 2-3 drops 3 times daily.
<u>C.I.</u>	: Sensitivity to drug.
<u>S.P.</u>	: Bone marrow suppression possible

Brand/Cost

CHLOROMYCETIN EAR DROPS (Parke Davis)	: Drops : 5%: Rs 3.50 for 5ml
KEMICETIN EAR DROPS (Mac)	: Drops : 1%: Rs 3.20 for 10ml 5%: Rs 2.90 for 6ml

16.1.2 GENTAMICIN

<u>Indication</u>	: Otitis externa, media and after mastoid surgery.
<u>Preparation</u>	: Drops: 0.3%
<u>Dose</u>	: 2-3 drops 3 times daily
<u>C.I.</u>	: Sensitivity to drug.
<u>Brand/Cost</u>	

GENTICYN EAR DROPS (Nicholas)	: Drops: Rs 3.49 for 3ml
----------------------------------	--------------------------

16.1.3

HAMYCINIndication: Otomycosis due to *Aspergillus niger*.Preparation

: 200,000 U/ml

Dose

: 2-3 drops 3 times daily.

C.I.

: Sensitivity to drug.

Brand/CostHAMYCIN SOLUTION
(HAL)

: 200,000 U per ml: Rs 8.27 for 10ml

16.1.4

DIBUCAINEIndication

: Relief of inflammatory pain.

Preparation

: Solution: 1.1%

Dose

: 5 drops 3-4 hourly.

C.I.

: Sensitivity to drug.

S.P.

: Infections may need associated antibiotic therapy.

Brand/CostOTOGESIC
(Ethnor)

: Drops: Rs 10.81 for 5ml

16.1.5

PARADICHLOROBENZENEIndication

: To dissolve ear wax

Preparation

: Drops : 2%

Dose: 5-10 drops, to remain for
10-30 min.Brand/CostWAXOLVE
(Bell)

: Drops : Rs 5.25 for 10ml

16.1.6

GLYCERINE IOTHAMOL

<u>Indication</u>	: Otitis externa.
<u>Preparation</u>	: Icthammol: 12.0g Glycerine: 100ml
<u>Dose</u>	: 2-3 drops 3 times daily

16.1.7

BETAMETHASONE

<u>Indication</u>	: Inflammatory conditions
<u>Preparation</u>	: 0.17% sol. with neomycin
<u>Dose</u>	: 2-3 drops 3 times daily
<u>S.P.</u>	: Vital, fungal or tubercular . conditions.
<u>Brand/Cost</u>	
BETNOR EAR DROPS (DCI)	: Drops: Rs 4.35 for 3ml

16.2 NOSE

16.2.1

OXYMETAZOLINE

<u>Indication</u>	: Decongestant
<u>Preparation</u>	: Drops: 0.05%, 0.025%
<u>Dose</u>	: 2 drops, 1-3 times daily
<u>C.I.</u>	: Glaucoma
<u>S.P.</u>	: Hypertension; cardiac disease; hyperthyroidism; rebound congestion.
<u>Brand/Cost</u>	
NASIVION (Merck)	: Drops: Rs 9.27 for 10ml
NASIVION PAEDIATRIC (Merck)	: Paediatric: Rs 8.56 for 10ml

16.2.2

XYLOMETAZOLINE

<u>Indication</u>	: Decongestant
<u>Preparation</u>	: Drops: 0.1%, 0.05%
<u>Dose</u>	: 2 drops 1-3 times daily
<u>C.I.</u>	: Glaucoma
<u>S.P.</u>	: Hypertension; cardiac disease; hyperthyroidism; rebound congestion.

Brand/Cost

OTRIVIN : Drops: Rs 9.13 for 10ml
(Ciba-Geigy)

OTRIVIN-PAEDIATRIC : Paediatric: Rs 8.12 for 10ml
(Ciba-Geigy)

16.2.3

CROMOGLYCAT SODIUM

<u>Indication</u>	: Allergic rhinitis
<u>Preparation</u>	: Drops: 2%
<u>Dose</u>	: 2 drops in each nostril, 3 times daily
<u>Brand/Cost</u>	
IFIRAL : Nasal spray: Liquid: Rs 10.51 (Unique) for 5ml	
FINTAL : Inhaler: Rs 80.00 for 112 dose unit. (Rallis Fisons)	

16.3 OROPHARYNX

16.3.1 MANDL'S PAINT

Indication

: Symptomatic relief of pharyngitis.

Preparation

: Iodine: 1.25g
Potassium iodide: 2.5g
Distilled water 2.5ml
Peppermint oil 0.6ml
Glycerine to 100ml

Dose

: To be applied to throat thrice daily

OPHTHALMIC DRUGS

When administered in the form of eye drops or ointments, drugs penetrate the eye ball, probably through the cornea. However, systemic effects, which are usually undesirable may arise from absorption of drugs into the general circulation via conjunctival vessels or from nasal mucose. Eye ointments are often applied to lid margins for blepharitis. They may also be used in the conjunctival sac, for other conditions especially where a prolonged action is required. When two different preparations in the form of eye drops are required at the same time of day, the second drug should be administered few minutes after the first one. It is not advisable for patients to continue to wear hydrophilic (soft) contact lenses when receiving eye drops.

When prescribing antibiotics in general, it is preferable to use topically in the eye drugs that are seldom or never used for systemic infections. However, the possibility of systemic absorption must be taken into consideration. Antibiotics with wide spectrum of activity are chloramphenicol, Framycetin, Gentamicin, Tetracycline and Tobramycin. Preparations containing combination of antibiotics and corticosteroids should not be used unless a patient is under close specialist supervision. A red eye is sometimes caused by the herpes simplex virus which produces a dendritic ulcer. Treatment with corticosteroids with or without antibiotics will aggravate the condition with a significant chance of loss of vision or even loss of the eye. These infections can be treated with idoxuridine or acyclovir. For active trachoma, tetracycline eye ointment three times daily for 6 weeks or Erythromycin or Sulphonamides can be used. For mass anti-trachoma treatment tetracycline

hydrochloride eye ointment applied to both eyes twice daily for five days in each month for six months.

In severe infections, systemic antibiotic treatment is given in addition to topical therapy. Eg., in gonococcal conjunctivitis in the new born and infective endophthalmitis. Pyrimethamine administered systemically is appropriate for treatment of toxoplasma choroidoretinitis.

Corticosteroids administered topically by subconjunctival injection and systemically are important in the treatment of uveitis and scleritis. "Steroid glaucoma" can occur following topical corticosteroids in patients prone to chronic simple glaucoma. Systemic corticosteroids can be used on an alternate day basis to minimise side effects. The risk of producing steroid cataract is very high if more than 15 mg. of prednisolone or equivalent is given daily for several years. Oxyphenbutazone eye ointment can be used for episcleritis. Topical preparations containing antihistamines can be used for allergic conjunctivitis.

The two properties of dilatation of the pupil and paralysis of the ciliary muscle are usually possessed equally by anticholinergic drugs applied topically, but they vary in potency. Short acting relatively weak mydriatics which paralyse the sphincter pupillae are used by the ophthalmologists to allow a better view of the fundus of the eye. Relative potencies and duration of action of the drugs in ascending order are tropicamide (3 hrs.) Cyclopentolate, Hyoscine and Homatropine (24 hrs.) and atropine (more than 7 days). Mydriatics may precipitate acute closed angle (congestive) glaucoma in a few patients, usually aged over 60 years who are predisposed

to the condition because of a small eye with shallow anterior chamber.

Glaucoma is treated by application of eye drops containing miotics, adrenaline, guanethidine or beta blockers. Acetazolamide and dichlorphenamide is given by mouth, and in emergency or before surgery, mannitol may be given by intravenous infusion. The following drugs produce miosis: Carbachol, Pilocarpine, and Physostigmine sulfate.

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17. EYE

17.1 MIOTICS AND ANTIGLAUCOMA DRUGS

17.1.1 PILOCARPINE

<u>Indication</u>	: Glaucoma;
<u>Preparation</u>	: Drops: 1%, 2%, 5%
<u>Dose</u>	: 1-2 drops as required.
<u>C.I.</u>	: Acute iridocyclitis
<u>S.P.</u>	: Can cause conjunctivitis on prolonged use.

Brand/Cost

PILOCAR (FDC)	: Drops: Rs 6.33 for 5ml vial
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17.1.2 TIMOLOL

<u>Indication</u>	: Glaucoma including open angle and secondary.
<u>Preparation</u>	: Drops: 0.25%, 0.5%
<u>Dose</u>	: 1 drop of 0.25-0.5% solution TID.
<u>C.I.</u>	: Second and third degree AV heart block, cardiac failure.
<u>S.P.</u>	: Bronchospasm, patient on oral beta blockers, pregnancy

Brand/Cost

GLUCOMOL (Torrent)	: 0.25% drops: Rs 14.95 for 5ml 0.5% drops: Rs 27.00 for 5ml
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17.1.3

ACETAZOLAMIDE

<u>Indication</u>	: Adjunct to local applications in glaucoma.
<u>Preparation</u>	: Tab : 250mg
<u>Dose</u>	: 250-500mg twice daily
<u>C.I.</u>	: Renal failure or acidosis.
<u>S.P.</u>	: May require potassium supplement
<u>Brand/Cost</u>	
DIAMOX (Cyanamid)	: Tab : 250mg: Rs 5.06 for 10

17.2 ANTI-INFECTIVE DRUGS (TOPICAL)

17.2.1

TETRACYCLINE

<u>Indication</u>	: Tetracycline sensitive infections, including trachoma.
<u>Preparation</u>	: 1% ointment, drops.
<u>Dose</u>	: 2-4 applications daily
<u>C.I.</u>	: Hypersensitivity to tetracycline
<u>Brand/Cost</u>	
ACHROMYCIN EYE (Cyanamid)	: Oint: 1%: Rs 1.27 for 3.5g Oil suspension: 1%: Rs 2.42 for 6ml
ALCYCLIN EYE (Alembic)	: Oint: 1%: Rs 1.45 for 3.5g

17.2.2

CHLORAMPHENICOLIndication

: Chloramphenicol sensitive infections including trachoma in cases where tetracycline cannot be used.

Preparation

: Oint: 1%
Drops: 0.4%

Dose

: 2-4 applications daily

C.I.

: Hypersensitivity to chloramphenicol.

S.P.

: Bone marrow suppression possible.

Brand/Cost

CHLOROMYCETIN
APPLICAPS
(Parke Davis)

: Applicaps: 1%: Rs 9.94 for 50 caps.

VANMYCETIN EYE
(FDC)

: Drops: Rs 3.31 for 5ml vial.

17.2.3

FRAMYCETINIndication

: Bacterial blepharitis and conjunctivitis.

Preparation

: 0.5% ointment.

Dose

: 2-4 applications daily.

C.I.

: Hypersensitivity to framycetin.

Brand/Cost

SOFRAMYCIN
(Roussel)

: Ophthalmic oint: 0.5%
Rs 2.46 for 3g

17.2.4

GENTAMICINIndication

: Bacterial blepharitis
and conjunctivitis

Dose

: 2-4 applications daily

C.I.

: Hypersensitivity to
gentamicin

Brand/Cost

GENTICYN EYE DROPS
(Nicholas)

: Drops: 0.3%: Rs 3.49 for 3ml

17.2.5

IDONURIDINEIndication

: Herpes keratitis

Preparation

: Drops: 1%

Dose

: 1-2 applications hourly
initially then 2-4 hourly.

C.I.

: Hypersensitivity

S.P.

: Do not use concurrent steroids.
Pregnancy.

Brand/Cost

RIDINOSE
(Bell)

: Drops: Rs 5.20 for 10ml

17.3 ANTI-INFLAMMATORY DRUGS (TOPICAL)

17.3.1

TRIAMCINOLONEIndication

: Inflammatory conditions

Preparation

: 1% ointment with gramicidin
and neomycin.
0.1% drops & ointment.

Dose : 2-3 applications daily.
C.I : Viral, fungus or tubercular infection. Glaucoma.
S.P. : Pregnancy; infants.

Brand/Cost

KENALOG-S EYE
(Sarabhai) : Oint: Rs 5.53 for 2.5g

17.3.2

BETAMETHASONE

Indication : Inflammatory conditions

Preparation : 0.1% drops and ointment with neomycin.

Dose : 4-6 hourly applications.

C.I. : Viral, fungal or tubercular infection; glaucoma.

S.P. : Pregnancy; infants.

Brand/Cost

BETNESOL-EYE/EAR
(Glindia) : Drops: 0.1%: Rs 4.08 for 3ml
Oint: 0.1%: Rs 3.41 for 3g.

BETNESOL N-EYE/EAR : Rs 3.65 for 3g

17.4 LOCAL ANAESTHETICS

17.4.1 LIGNOCAINE : See 2.2.2

17.5 MYDRIATICS & CYCLOPLEGIC DRUGS

17.5.1 ATROPINE

Indication : For maximal and long acting mydriasis for diagnosis and in uveitis.

<u>Preparation</u>	: 1% drops and ointment.
<u>Dose</u>	: 1-2 drops as needed.
<u>C.I.</u>	: Narrow angle glaucoma.
<u>S.P.</u>	: Can precipitate glaucoma in elderly and atropine toxicity in infants.

Brand/Cost

BELLIPINO-ARTIN
(Bell)

: Drops: Rs 4.65 for 5ml
Oint: Rs 3.50 for 3g

17.5.2

HOMATROPINE

<u>Indication</u>	: For routine mydriasis
<u>Preparation</u>	: 1%, 2% drops
<u>Dose</u>	: 1-2 drops as needed
<u>C.I.</u>	: Narrow angle glaucoma.
<u>S.P.</u>	: Can precipitate glaucoma in elderly and atropine toxicity in infants.

Brand/Cost

BELL HOMATROPINE EYE
(Bell)

: Drops: Rs 4.20 for 10ml

17.5.3

EPINEPHRINE (adrenaline)

<u>Indication</u>	: For routine mydriasis.
<u>Preparation</u>	: Drops: 5%, 10%
<u>Dose</u>	: 1-2 drops as needed.
<u>C.I.</u>	: Narrow angle glaucoma.

S.P. : Can precipitate glaucoma
in elderly.

Brand/Cost

DRDSYN EYE DROPS : Drops: 5%: Rs 9.13 for 10ml
(FDC) 10%: Rs 14.82 for 10ml

17.6 MISCELLANEOUS

17.6.1 HYDROXYPROPYL METHYL CELLULOSE

Indication : Demulcent, esp., in conjunctivitis
sicca.

Preparation : See composition.

Dose : 1-2 drops 4 times daily.

Brand/Cost

MOISOL EYE DROPS : Drops: Rs 4.93 for 10ml
(FDC)

17.6.2 CROMOGLYCAT E SODIUM

Indication : Allergic conjunctivitis.

Preparation : Drops : 2%

Dose : 1-2 drops 4 times daily.

S.P. : Needs 4-6 weeks trial to
assess efficacy.

Brand/Cost

IFIRAL EYE DROPS : Drops: 2% : Rs 21.00 for 10ml vial.
(Unique)

SKELETAL MUSCLE RELAXANTS

Muscle relaxants are of two types. Those used in anaesthesia known as neuromuscular blocking drugs and those used in musculoskeletal disorders.

Anaesthetic relaxants act by specific blockade of the neuromuscular junction, enabling the employment of light levels of anaesthesia with adequate relaxation of muscles. Their use should always be combined with assisted ventilation until their effect has been antagonised. The non-depolarizing muscle relaxants: Tubocurarine, Pancuronium and Gallamine cause blockade by competitive inhibition of acetyl choline at the receptor site. They have a slower, less complete and longer lasting effect than the depolarising muscle relaxants. Tubocurarine starts to act between 3 - 5 minutes and lasts for 30 minutes. It may cause a histamine induced rash and be associated with transient hypotension at the onset of blockade. Ether potentiates the effect of Tubocurarine. Pancuronium has a quicker onset of action and does not cause histamine release or significant changes in blood pressure. Gallamine has a more rapid onset of action and recovery than either of the above but causes tachycardia by vagolytic action, and should be avoided in patients with renal disease.

Depolarising have a five minute duration of action. They cause prolonged depolarisation and produce rapid, complete and predictable paralysis with spontaneous recovery. Unlike non-depolarising muscle relaxants, their action cannot be reversed and clinical application is therefore limited to short procedures such as intubation. Paralysis is preceded by muscle fasciculation. /muscle relaxants of which suxamethonium is the only commonly used drug

There is a transient rise in serum potassium and Creatinine Phosphokinase with post-operative muscle pain. It is contraindicated in liver disease and in burned patients. Premedication with atropine is desirable. Prolonged muscle paralysis occurs in patients with low or atypical plasma pseudocholinesterase and in "dual block"(repeated doses of suxamethonium causes development of non-depolarising block, following the primary depolarising block). Artificial ventilation should be continued until muscle function is restored.

Muscle relaxants used in spasticity act principally on the central nervous system with the exception of Dantrolene which has a direct intra-cellular muscle effect.

The underlying cause of spasticity should be treated and any aggravating factors remedied. The major disadvantage in their use is that reduction of muscle tone can cause a loss of splinting action of the spastic leg and trunk muscles, leading to increased disability. Diazepam and baclofen have similar clinical effects and may cause sedation and hypotonia. Dantrolene produces fewer central adverse effects making it a drug of choice. Doses should be increased slowly.

18. MUSCULOSKELETAL SYSTEM AND GOUT

18.1 MUSCLE RELAXANTS (Peripherally acting)
AND CHOLINESTERASE INHIBITORS18.1.1 GALLAMINEIndication

: Medium duration of muscle relaxation (non-depolarising) (More rapid onset of action and recovery than Tubocurarine or Pancuronium).

Preparation/Dose

: Inj : 4% in 2ml amp.
Dose: 80-120mg I.V. initially and 20-40mg supplements.
Child: 1.5mg/kg.

S.E.

: Undesirable tachycardia.

S.P.

: Avoid in patients with severe renal disease as it is excreted by kidneys.

Brand/Cost

FLAXEDIL
(M & B)

: Inj : 2ml amp: Rs 40.84 for 10 amp.

18.1.2 PANCURONIUM BROMIDEIndication

: Non-depolarising muscle relaxant of medium duration (quicker onset of action and not much change in BP)

Preparation/Dose

: Inj : 2mg/2ml
Dose: Initially for intubation 50-100 micrograms/kg, then

10-20 microgram/kg
as required.

Child: initially 60-100 microgram/kg.
then 10-20 microgram/kg.

Neonate 30-40 microgram/kg.,
then 10-20 microgram/kg.

C.I.

: Myasthenia gravis.

S.P.

: Where tachycardia may be dangerous
Reduce dose in obesity and
renal failure.

Brand/Cost

PAVILON
(Infar)

: Inj : 2mg/2ml: Rs 15.35 per amp.

18.1.3

TUBOCURARINE

Indication

: Non-depolarising muscle relaxant
of medium to long duration.

Preparation/Dose

: Inj : 10mg/ml
Dose: 15-30mg, IV initially and
and 5-10mg supplements

S.E.

: May cause erythematous rash on
chest and neck.

S.P.

: Onset of blockade may be
associated with hypotension.

C.I.

: Mayasthenia gravis.

Brand/Cost

TUBARINE
(Burroughs Wellcome)

: Inj : 10mg/ml: Rs 57.72 for 5ml v

18.1.4

SUXAMETHONIUM CHLORIDE (SUCCINYL CHOLINE)

- Indication : Depolarising muscle relaxant of short duration.
- Preparation/Dose : Inj : 50mg/ml--10ml vial.
- S.E. : Prolonged muscle paralysis may occur in patients with low or atypical plasma pseudocholinesterase enzyme and in dual block.

Brand/Cost

- MIDARINE
(Burroughs Wellcome) : Inj : 50mg/ml: Rs 6.99
for 10ml vial.
- SCOLINE
(Glaxo) : Inj : 50mg/ml: Rs 7.82 for
10ml.

18.1.5

NEOSTIGMINE

- Indication : For reversing the effect of non-depolarising muscle relaxant such as tubocurarine. Poisoning with atropine, hyoscine or datura. Myasthenia gravis.
- Preparation/Dose : Tab : 15mg
Inj : amp: 0.5mg/ml vial:
2.5mg/ml - 5ml vial
Acts within one minute of IV injection and lasts 20-30 min.
Dose: 1mg/20kg body weight.
- S.P. : Atropine should be given before or with neostigmine to prevent bradycardia. Excessive salivation and other muscarinic actions. Cholinergic crisis.

Brand/Cost

PROSTIGMIN
(Roche)

: Inj : Rs 122.18 for 50 amp.
Tab : 15mg: Rs 34.41 for 20 tab.

18.2 DRUGS USED IN GOUT

18.2.1 ALLOPURINOLIndication

: Gout; secondary hyperuricaemia.

Preparation/Dose

: Tab : 100mg

Dose: Initially 100mg daily as
a single dose after food;
gradually increased over 1-3 week
to about 300mg daily. Maintenance
dose: 200-600mg (according to
plasma uric acid level.)

S.E.

: Rashes, sometimes with fever;
gastro-intestinal upset. Rarely
malaise, headache, vertigo,
drowsiness, taste, disturbance,
hypertension, alopecia,
hepato-toxicity.

C.I.

: Acute gout.

Brand/Cost

ZYLORIC
(Burroughs Wellcome)

: Tab : 100mg: Rs 5.84 for 10

18.2.2.

COLCHICINEIndication : Gout

Preparation/Dose : Tab : 0.5mg
 Dose: 1mg initially, then
 0.5mg every 2-3 hours
 until relief of pain or vomiting
 or diarrhoea or until a total
 dose of 10mg reached.

S.E. : Nausea, vomiting, abdominal
 pain, diarrhoea, gastro-intestinal
 haemorrhage, rashes, renal damage,
 peripheral neuritis, alopecia,
 blood disorders.

S.P. : Elderly; cardiac or gastro-
 intestinal disease; renal
 impairment; pregnancy; breast
 feeding.

Brand/Cost

COLCHINDON
 (Indon Pharma)

: Tab : 0.5mg: Rs 6.00 for 30

18.2.3

PROBENECIDIndication : Gout

Preparation/Dose : Tab : 500mg
 Dose: Uricosuric treatment:
 250mg b.d. after food,
 increased after a week to 500mg
 b.d. then up to 2g daily in 2-3
 divided doses and according to
 plasma uric acid level.

To achieve penicillin and cephalosporin blood levels: 1g at same time as oral penicillin or cephalosporin or 30 min. before an I.M. injection.

S.E.

: Nausea, vomiting, urinary frequency, headache, flushing, rashes, hypersensitivity, nephrotic syndrome, aplastic anaemia, hepatic necrosis.

C.I.

: Acute gout, nephrolithiasis, concurrent salicylate treatment, blood disorders.

Brand/Cost

BENEMID
(Merind)

: Tab : 500mg: Rs 17.00 for 20

OXYTOCICS

Myometrial stimulants are used to induce abortion, induce or augment labour and to minimise blood loss from the placental site. They include oxytocin, ergometrine and prostaglandin.

Extra or intra amniotic administration of prostaglandin can be used for induction of late therapeutic abortion i.e., after 14 - 16 weeks gestation. They are contraindicated in conditions where prolonged uterine contractions would be inappropriate.

Oxytocin is administered by slow intravenous infusion to induce or augment labour, often in conjunction with amniotomy. Uterine activity must be monitored and hyperstimulation should be avoided. It should be used with caution, in multiple pregnancy, grand multipara, previous caesarean section and hypertension. Prostaglandins in the form of vaginal tablets and gels can also be used for induction of labour. Intravenous and oral routes of prostaglandins are not used.

Bleeding due to incomplete abortion can be controlled with ergometrine and oxytocin, given intravenously or intramuscularly. For routine management of the third stage of labour, ergometrine is given by intramuscular injection after the delivery of the shoulders. Intravenous injection is needed for prevention of post-partum haemorrhage in high risk cases. Ergometrine should not be given during first and second stage of labour, in patients with heart disease and hypertension.

19. OBSTETRICS

19.1 OXYTOCICS

19.1.1 METHYLERGONOVINE MALEATE

<u>Indication</u>	: Active management of third stage of labour. Post partum haemorrhage, subinvolution of puerperal uterus.
<u>Preparation/Dose</u>	: Inj : 0.2mg/ml Dose: 0.2mg IV or IM Tab : 0.25mg - 0.5mg TID
<u>S.E.</u>	: Nausea, vomiting, transient hypertension, vasoconstriction.
<u>C.I.</u>	: 1st and second stages of labour. Obliterative vascular disease. Impaired hepatic and renal function
<u>S.P.</u>	: Toxaemia, cardiac disease, hypertension, sepsis, multiple pregnancy.
<u>Brand/Cost</u>	
METHERGIN (Sandoz)	: Inj : 0.2mg/ml: Rs 11.95 for 6 amps Tab : 0.125mg: Rs 9.56 for 5

19.1.2 OXYTOCIN

<u>Indication</u>	: Induction and augmentation of labour; management of missed or incomplete abortion; post partum haemorrhage.
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Preparation/Dose

: Inj : 5U/ml, 2U/ml

Dose: by slow I.V. infusion

as a solution containing

1 unit/litre, 1-3 milliunits/min.,
adjusted according to response.

P.P.H. - 5-10 units/500ml

given at a rate of 15 drops/min.

S.E.: High doses cause violent uterine
contraction leading to rupture
and foetal asphyxia. Arrhythmia,
maternal hypertension. Subarachnoid
haemorrhage. Water intoxication.S.P.: Hypertension, multiple pregnancy;
high parity, previous caesarian
section.C.I.: Hypertonic uterine inertia.
Mechanical obstruction to delivery.
Foiled trial labour. Severe toxæmia.
Predisposition to aminotic;
fluid embolism; fetal distress;
placenta prævia.Brand/CostPITOCIN
(P.D. & Co): Inj : 10 I.U./ml, 0.5ml amp:
Rs 6.72 for 6 amp.SYNTOCINON
(Sandoz)

: Inj : 5 I.U./ml: Rs 6.72 for 6 amp.

19.2 MAGNESIUM SULPHATE : (See 21.2.6)

Indication : Eclampsia

Preparation/Dose : 50% 2ml amp.

Brand : STERLING PHARMA

20. ANTI-ASTHMATICS

The goals of anti asthmatic therapy are rapid reversal of bronchospasm and prevention of respiratory failure. Mild to moderate attacks respond to aerosol administration of a selective beta-adrenoceptor stimulant such as salbutamol or terbutaline. In frequently occurring moderate asthma, the introduction of sodium cromoglycate, theophylline or corticosteroid aerosol, inhalation may stabilise the asthma and avoid the use of oral corticosteroids. However, in most severe attacks a short course of an oral corticosteroid may be necessary to bring the asthma under control. Treatment of patients with severe airways obstruction or status asthmaticus is safer in hospital where oxygen and resuscitation facilities are immediately available. Many patients with chronic bronchitis and emphysema are generally considered to have irreversible airway obstruction, but they nevertheless often respond partially to the beta-adrenoceptor stimulant drugs. Acute exacerbations of chronic asthma is usually due to secondary infections and should be treated with antibiotics along with anti-asthmatics.

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ANTI-TUSSIVES

Anti-tussives are drugs used for symptomatic relief of cough. ~~and~~ They are NOT substitutes for the specific therapy of the underlying pathological condition. These are pharyngeal demulcents, expectorants and cough suppressants.

Pharyngeal demulcents are administered in the form of lozenges, troches, cough drops or linctuses. These are mainly used to relieve^{ie} dry irritating cough. Expectorants are useful in the therapy of chronic cough due to irritation of respiratory mucosa and in conditions where secretion is thick and viscid, needing liquefaction, as in bronchial asthma, chronic bronchitis and emphysema. Potassium iodide, ammonium chloride and ipecacuanha are the commonly used expectorants. Compound cough preparations are not of much use, because many of these contain an unnecessarily large number of ingredients, often in sub-therapeutic doses, and with opposing effects. It is therefore best to prescribe one of the simple cough mixtures and if any other component is needed, it may be then prescribed separately, tailored to the needs of the patient and dosage adjusted accordingly.

Cough suppressants are mainly useful in symptomatic relief of dry irritant type of cough. They cause sputum retention which may be harmful in patients with chronic bronchitis and bronchiectasis. The commonly used cough suppressants are codeine, dextromethorphan, noscapine, pholcodine and anti histamines such as diphenhydramine, dimenhydrinate etc. Morphine and methadone are effective cough suppressants and are given in linctuses to control distressful cough in terminal lung cancer. In other circumstances they are contraindicated because they induce sputum

retention and ventilatory failure as well as causing narcotic dependence. Cough suppressants containing codeine or similar narcotic analgesics are not recommended in children and should be avoided altogether in those under one year of age. Most anti-tussives contain compounds that will enhance the CNS depressant action of other concomitantly administered drugs. This is to be made note of.

20. RESPIRATORY TRACT, DRUGS ACTING ON THE

20.1 OXYGEN

20.2 ANTI-ASTHMATIC DRUGS

20.1.1 ADRENALINEIndication

: Acute asthma.
 Acute allergic and anaphylactic reactions.

S.E./S.P./C.I.

: As under 3.3.1

Brand/Cost

ADRENALIN
 (Bengal Immunity)

: See under 3.3.1

20.1.2 AMINOPHYLLINEIndication

: Reversible airways obstruction.
 Left ventricular failure.
 Status asthmaticus.

Preparation/Dose

: Tab : 100mg
 Dose: 100-300mg, 3-4 times daily.
 Inj : 2.5%--10ml amp. (250mg/10ml)
 By slow I.V. 250-500mg (5mg/kg)
 over 20 min. Maintenance: 5mg/kg
 by slow infusion.
 Child: 15-20mg/kg/day and
 8 hr. orally.
 I.V. 5-7mg/kg
 dose followed by 0.9mg/kg/hr.

S.E.

: Tachycardia, palpitations, nausea, gastro-intestinal disturbances, insomnia, arrhythmias, convulsions, esp., if given rapidly.

S.P.

: Dose in liver disease; epilepsy, cardiac disease, breast feeding, elderly patients, fever.

Brand/Cost

AMINOPHYLINE

: Inj : 0.5g/2ml: Rs 9.24 for 10 amps.

0.25g, 10ml amp: Rs 7.73 for 5 amps.

Tab : 100mg: Rs 2.00 for 25

20.1.3

DERIPHYLLIN (Etophyllin & Theophylline)Indication

: Reversible air ways obstruction.

Preparation/Dose

: Tab : 100mg 1-3 TID

300mg (Retard) 1 TID

Inj : 220mg/2ml.

Syrup: 60mg/5ml

Child: 20-25mg/kg/day Q8h oral.

S.E./S.P./C.I.

: As for aminophylline

Brand/Cost

DERIPHYLLIN
(German Remedies)

: Inj : Rs 47.68 for 50 amps.

Syrup: Rs 4.26 for 100ml

Tab : Rs 15.66 for 150

DERIPHYLLIN RETARD

: Tab : Rs 14.91 for 60

20.1.4

ORCIPRENALINEIndication

: Reversible airways obstruction.

Preparation/Dose

: Tab : 10mg, 20mg

Syrup: 10mg/5ml

Inj : 0.5mg/ml - 1ml amp.

Dose: 1-2 tabs 3-4 times daily

Child: 1 tab TID

Syrup: 5-10ml

Child: 5ml

Inj : 1-2 amp. IM or slow I.V.

Child: 1/2--1 amp.

S.E.

: As under Salbutamol

Brand/CostALUPENT
(German Remedies): Inj : 0.5mg/ml: Rs 13.06 for .
10 amp.Syrup: 10mg/5ml: Rs 23.58 for
120 ml

Tab : Rs 33.90 for 100

20.1.5

TERBUTALINE SULPHATEIndication: Reversible airways obstruction,
severe acute asthma.

By I.V. continuous infusion

3-5 microgram/ml. 1.5-5 microgram

min. for 8-10 hours. Reduce

dose for children.

Preparation/Dose

: Tab : 2.5mg & 5mg

Inj : 0.5mg/ml - 5ml amp.

Inhaler: 250mg/metered dose

Dose: 2.5-5mg, 7 hourly orally.

Child: 0.1mg/kg/day Q8h orally.

By subcutaneous IM or slow IV
injection 250-500microgram upto
4 times daily.

Child: 2-15 years: 10 microgram/kg
to a max of 300 microgram.

Inhaler 1-2 puffs, 3-4 times daily
max. 24 puffs in 24 hours.

S.E.

: As under Salbutamol

Brand/Cost

BRICANYL
(Astra IDL)

: Inj : 0.5mg/ml: Rs 11.26 for 5 amp.
Tab : 2.5mg: Rs 3.06 for 12
5mg: Rs 4.70 for 12
Syrup: 3mg/5ml: Rs 5.00/60ml

TERBUTALINE
(Cipla)

: Tab : 2.5mg: Rs 2.40 for 10
5mg: Rs 3.70 for 10
Syrup: 1.5mg/5ml: Rs 8.00 for 112ml

20.1.6

SALBUTAMOL

Indication

: Reversible airways obstruction.
Severe acute asthma.

Preparation/Route/
Dose

: Tab : 2mg, 4mg, 8mg (SA)
Syrup: 2mg/5ml
Inhaler: 100mcg/dose
Dose: 2-4mg 3-4 times daily.
Child: 0.01 - 0.1mg/kg/dose Q8h oral.
Inhaler: 1-2 puffs, 3-4 times daily.
Child: 1 puff, 3-4 times daily
Max. 8 puffs/day.

Inj : S/C or IM 500 microgram
repeated every 4 hours if
necessary. Slow I.V. 250 microgram
repeated if necessary.

Child: 4-6mg/kg/dose, SC, IM or
slow IV every 6-8 hours.

I.V. infusion: initially
5 micrograms/min. adjusted
according to response usually
in range 3-20 microgram/min.

S.E.

: Fine tremor (hands); nervous
tension; headache; peripheral
vasodilation; tachycardia;
hypokalaemia (after high
doses). Slight pain on IM

S.P.

: Hyperthyroidism; ischaemic
heart disease; hypertension;
pregnancy; elderly patients.
I.V. administration to diabetes:
monitor blood glucose.

Brand/Cost

ASTHALIN
(Cipla)

: Inj : 250 micrograms/5ml:
Rs 13.15 for 5 amp.

Tab : 2mg: Rs 3.41 for 10
4mg: Rs 5.16 for 10

Syrup: 2mg/5ml: Rs 5.60 for 56ml

Inhaler: 100microgram: Rs 25.25
for 200 metered doses.

BRONKOTAB
(Biddle Sawyer)

: Tab : 2mg: Rs 13.30 for 100

Syrup: 2mg/5ml: Rs 8.06 for 120ml

20.1.7

BECLOMETHASONEIndication

: Chronic airways obstruction, especially when not controlled by bronchodilators and requiring steroids.

Preparation/Route/
Dose

: Inhaler: 50 microgram per dose of aerosol.

Dose: 2 inhalations TID up to maximum of 20 inhalation a day.

Child: 1 inhalation TID up to maximum of 10 a day.

S.E.

: Hoarseness of voice.
Candidiasis of mouth or throat (rinsing of mouth with water after inhalation may help).

S.P.

: Respiratory infections.
Active or quiescent tuberculosis of lung.

Brand/Cost

BECLATE INHALER
(Cipla)

: 50 micrograms: Rs 45.00 for 200 metered doses.

Nasal spray : 50 micrograms:
Rs 51.95 for 200 metered doses.

20.1.8

SODIUM CROMOGLYCATEIndication

: Prophylaxis of bronchial asthma.

Preparation/Route/
Dose

: 20mg/cartridge (spin cap)
20 cartridges with inhaler.

Dose: 1 spin cap 4 times daily;
in severe cases up to 8 times daily for 4-6 weeks. Continue at reduced dose if beneficial.
Aerosol Inhaler.

S.E.

: Coughing; transient
bronchospasm and throat
irritation due to inhalation
of powder
(Using Salbutamol inhaler few
minutes before may help).

Brand/Cost

IFIRAL
(Unique)

: Inhaler: Rs 14.83 for 20 cartons
Nasal spray: Rs 10.51 for 5ml

FINTAL
(Rallis Fison)

: Rs 78.89 for 120 metered doses.

20.2 ANTITUSSIVES

20.2.1 COUGH SUPPRESSANTS

Indication

: For sleep disturbed by dry or
painful cough.

Preparation/Route/
Dose

: For composition and dose
consult instructions on
brands.

S.E.

: May cause sputum retention and
this may be harmful in patient
with chronic bronchitis and
bronchiectasis.

Constipation. Codeine or simil
opioid containing preparations
generally not recommended in
children. Avoid in those below
1 year of age.

Brand/Cost

LINCTUS CODEINE
(Astra)

: Dose: 2-5ml tid.
Rs 9.00 for 40ml

20.3.1

DOXAPRAM HClIndication

- : Acute respiratory failure
(See notes on above)
Post anaesthesia drug induced.

Preparation/Route/
Dose

- : Inj : 20mg/ml -5ml vial
Dose: 0.5-2.0 mg/kg I.V.

S.P.

- : Concurrent treatment with
mono-amine oxidase inhibitor;
incompatible with aminophylline,
frusemide; thiopentone sodium
and other alkaline solutions.

C.I.

- : Epilepsy and other convulsive
disorders; severe hypertension;
hyperthyroidism; status
asthmaticus; coronary artery
disease.

Brand/Cost

DOPRAM
(Khandelwal)

- : Inj : 20mg/ml: Rs 20.76/5ml.

TIXYLIX LINCTUS (M & B)	: Rs 6.75 for 125ml
PHENSEDYL (M & B)	: Liquid: Rs 8.24 for 125 ml
COSCOPIN LINCTUS (Biological-E)	: Rs 6.44 for 100ml.

20.2.2

COUGH EXPECTORANTS AND DEMULCENTS

<u>Indication</u>	: Cough with expectoration.
<u>Preparation/Route/ Dose</u>	: For composition and dose consult instruction to brands.

S.E. : Sedation.

Brand/Cost

AVIL EXPECTORANT : Rs 7.00 per 100ml.
(Hoechst)

BENADRYL : Rs 9.90 per 114ml
(P.D. & Co)

DILOSYN EXPECTORANT : 9.52 per 120ml
(Allenburys)

PIRITON EXPECTORANT : Rs 5.06 for 115ml
(Glaxo)

20.3 RESPIRATORY STIMULANTS (Analeptic Drugs)

<u>Indication</u>	: (Limited use) In chronic obstructive pulmonary disease when patient drowsy may arouse him sufficient to cooperate with physiotherapy and clearing of secretions.
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22. IMMUNOLOGICAL PRODUCTS AND VACCINES

Vaccines are designed to produce specific protection against a given disease. They may be live attenuated (BCG, Rubella, measles), inactivated preparations of virus (influenza) or bacteria (typhoid) or detoxified exotoxins (tetanus toxoid). Live attenuated vaccines generally achieve protection with a single dose but three doses are required in the case of oral polio vaccine. Inactivated vaccines usually require a primary series of doses to produce an adequate antibody response followed by a booster injection.

Some vaccines (e.g., OPV) produce very few reactions while others (e.g., measles and rubella) may produce a very mild form of the disease. Live virus vaccines should never be routinely administered to pregnant women (because of possible harm to the fetus), individuals with impaired immunity and those suffering from malignant conditions.

Immunity with immediate protection against certain infective organisms can be obtained by injective preparations made from the plasma of immune individuals (passive immunity). Antibodies of human origin are usually termed "immunoglobulins" while "antiserum" (e.g., anti-tetanus serum) is applied to material prepared in animals. Serum sickness and other allergic - type reactions may follow injections of anti-sera limiting the usefulness of these products. This therapy has been replaced wherever possible by the use of immunoglobulins. Human immunoglobulins are of two types - normal immunoglobulin (gamma globulin) prepared from pools of at least 1000 donations of human plasma and specific immunoglobulins which are prepared by pooling the blood of conval-

scent patients or of immunised donors who have recently been specifically boosted. Gammaglobulin can be administered for the protection of susceptible contacts against hepatitis A, measles and rubella.

Examples of specific immunoglobulins are anti-tetanus immunoglobulin, anti-hepatitis B immunoglobulin and anti-rabies immunoglobulin. Refrigerated storage of vaccines and immunological products is usually required at a temp. of 2° - 8°C . Opened multi dose vials which have not been fully used should be discarded within one hour if no preservative is present (most live virus vaccines) or within 3 hours (when vaccines containing a preservative are used). Ampoules should always be adequately shaken before use to ensure uniformity of the material to be injected.

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22. IMMUNOLOGICALS

22.1 DIAGNOSTIC AGENTS

22.1.1 TUBERCULIN
PURIFIED PROTEIN DERIVATIVE (PPD)

Indication : As an aid to diagnosis of tuberculosis.

Preparation/Dose Route : Mantoux test
Test dose 10 units/0.1ml by intradermal injection on flexor aspect of forearm.
Result read 48-72 hours after injection.
Positive - diameter of induration measuring 10mm or more - measured transversely to long axis of forearm. If negative may repeat using second strength PPD (100-250 tuberculin units)
10 TU/0.1ml - 5ml vials
5 TU/0.1ml - 5ml vials

S.P. : False negative:
1. Subcutaneous
2. Loss of potency of PPD
3. Errors in dilution
4. Prolonged exposure of PPD to heat or light.
5. Bacterial contamination of PPD solution.

Reactivity may be depressed or suppressed due to:

- viral infection
- live virus vaccines
- administration of corticosteroids
- malnutrition
- immune suppressed host.

Positive reaction does not necessarily signify the presence of active disease. Distinction between clinical and dormant infection is made only on clinical, bacteriological and radiological criteria.

Brand/Cost

TUBERCULIN PPD : 10 TU/0.1ml: Rs 38.00 per 5ml.
(Span Diagnostics)

Government Health
Services

22.2 SERA AND IMMUNOGLOBULINS

✓ ALL PLASMA FRACTIONS SHOULD COMPLY WITH THE GOVERNMENT AND WHO REGULATIONS FOR COLLECTION, PROCESSING AND QUALITY CONTROL OF HUMAN BLOOD AND BLOOD PRODUCTS-- INCLUDING IMMUNOGLOBULINS. /

22.2.1 ANTI-D-IMMUNOGLOBULIN

Indication : To prevent a Rhesus negative mother from forming antibodies to foetal Rhesus positive cells, to protect any further child from haemolytic disease.

Preparation/Route/
Dose : Dose for Rh negative: 250-500 units IM within 72 hours of birth or abortion of a Rh positive infant. After transfusion up to 5000 units IM

22.2.2 ANTI DIPHTHERITIC SERUM (ADS)Indication

- : Prophylaxis of **schick** positive individuals in close contact with diphtheria patient.
- Treatment of diphtheria.

Preparation/Route/
Dose

- : Anti-toxin globulin derived from horse serum actively immunized against with diphtheria.
- 10,000 IU in ampoules.
- 20,000 IU in ampoules.
- Dose: Prophylaxis 4000, 10,000 IU IM. Dose same for children and adults.
- Treatment: mild nasal/pharyngeal diphtheria: 40,000 IU IV.
- Moderately severe diphtheria: 80,000 IU IV.
- Severe pharyngeal/laryngeal infection more than 48 hours: 120000 I.U. IV
- Brawny oedema of neck

S.E.

- : Anaphylactic shock; urticaria; serum sickness may occur after 2-3 weeks.

S.P.

- : Intradermal skin test to be done: 0.02ml of 1:100 solution I.D. Wheal in $\frac{1}{2}$ hr indicates sensitivity
- Eye test: one drop of 1:1000 dilution in normal **saline** applied to eye.
- Lacrimation, redness in $\frac{1}{2}$ hr. indicates sensitivity.

Brand/Cost

(HAFFKINE)

: 10,000 IU - 5ml amp: Rs 207.10
 10ml amp: Rs 207.10

Desensitisation if patient is sensitive to horse serum but administration is absolutely necessary.

Inj : S.C or IM at 15 min interval
 0.05ml of 1:20 dilution S.C
 0.1ml of 1:10 dilution S.C
 0.2ml of 1:10 dilution S.C
 0.1ml of undiluted S.C
 0.2ml of undiluted IM
 0.5ml of undiluted IM

Then total dose may be given.

Keep adrenaline and antihistamine ampoules at hand during therapy.

IM dose always to precede IV dose
 Total dose to be given as a single injection to reduce risk of sensitisation.
 Active immunisation to be initiated simultaneously as period of protection is short (2 - 4 weeks).

22.2.3 ANTI RABIES SERUM (ARS)

Indication

: Post exposure treatment of severe (Type III) animal bites.

Preparation

: Animal serum containing globulin with specific power of neutralising rabies virus. Has 80 units/ml of serum; 1 vial has 1000 units.

Dose: If less than 48 hours after bite, 1000 units/25kg body weight partly around the wound and partly IM.

If above 72 hours since bite, 2000 units/25kg body weight partly around wound and partly IM.

S.P./S.E.

: As for ADS

22.2.4 ANTI-VENOM SERA

Indication

: Acute poisoning due to bite by venomous snakes.

Brand/Cost

(HAFFKINE)

: Refer product literature.

Inj : 10ml vial: Rs 124.60

22.2.5 IMMUNOGLOBULIN (Gamma Globulin Human Normal Immunoglobulin)

Indication

: Management of hypogamma globulinaemias. Protection of susceptible contacts against hepatitis A, measles and, to a lesser extent, Rubella.

Preparation

: 16.5% W/V 1ml & 2ml amps.

Dose: 0.02ml/kg dose in children (average). Dose varies with indication (see literature).

22.2.6 TETANUS ANTITOXIN (TAT)

<u>Indication</u>	: Treatment of tetanus. Prophylaxis against tetanus in people under risk (not actively immunised earlier). eg., road accident victims with open wounds.
<u>Preparation</u>	: Anti-toxin globulin derived from horse serum. Ampoule - 750 I.U.; 1500 I.U.; 10,000 I.U.; 20,000 I.U. 50,000 I.U. Dose: Treatment - single dose 50,000 to 1,00,000 half I half IV Prophylaxis 3000-5000 I.U. IM
<u>S.P./S.E.</u>	: As for ADS
<u>Brand/Cost</u>	
(HAFFKINE) (Serum Institute)	: Inj (Prophylactic): I.U. 1500: Rs 7.75/ml Inj (Therapeutic): I.U. 10,000: Rs 47.50 for 3.4ml amp.

22.2.7 TETANUS IMMUNE GLOBULIN

<u>Indication</u>	: As for TAT
<u>Preparation</u>	: Standardised solution of gamma globulin from human plasma with an increased titre of tetanus antitoxin.

Amp. with 165 mg of gamma globulin/ml.

Dose: 250-500 units for prophylaxis. 3000-6000 units for treatment, IM. Part of the dose to be infiltrated locally around wound.

S.P.

- : Active immunisation to be initiated simultaneously as protection lasts for only 2 weeks.

22.3 VACCINES

22.3.1 FOR UNIVERSAL IMMUNISATION

22.3.1.1 BCG VACCINE

Indication

- : Primary immunisation
BCG testing.

Preparation

- : Live attenuated bovine M. tuberculosis, freeze dried.
Dose: 0.05ml in neonates
0.1ml in older children.
Intradermal using tuberculin syringe.
Other techniques: multipuncture dermojet, scarification.

S.E.

- : Penetration into SC tissue may cause local abscess.
Axillary lymphadenitis, rarely tuberculous, periostitis, disseminated tuberculosis.

C.I.

- : Immune deficiency states; febrile illness; pregnancy.

S.P.

: To be refrigerated.

Can be stored at room temperature for 2-4 weeks only. To be used within 3 hours of reconstitution with saline (not distilled water).

22.3.1.2 DIPHTHERIA-PERTUSIS-TETANUS VACCINE (DPT)Indication: Routine immunization
(see immunisation schedule).Preparation/Dose

: Dose: 0.5ml deep IM

S.E.

: Local pain and induration; fever; fretfulness; convulsions; collapse rarely.

C.I.: Acute febrile illness; history of convulsions, urticaria, eczema, CNS disease in the child.
Steroid therapy.S.P.: Store at 2° - 10°
Do not freeze.
Shake ampoule vigorously before use.Brand/Cost

(Serum Institute)

(Glaxo)

22.3.1.3 DIPHTHERIA-TETANUS (DT) VACCINEIndication

: Routine immunisation for children with history of convulsions, family history of convulsions or CNS disease where DPT is contra-indicate

<u>Preparation/Dose</u>	: 0.5ml IM. 1vial of 10 doses.
<u>S.E.</u>	: Mild pain febrile reaction.
<u>S.P.</u>	: Store between 4-8° c.
<u>C.I.</u>	: Acute illness; recent infection; allergic disease.

22.3.2.1

CHOLERA VACCINEIndication

- : In endemic areas, pre-monsoon.
During cholera epidemics.
Before visiting crowded areas,
eg., fairs and festivals.

Preparation/Dose

- : Dose: 0.5ml deep SC or IM
2nd dose 4-6 weeks after first.
Booster every 6 months.
Prep: 1 ml amp
10ml vials.

S.E.

- : Local pain and tenderness.
Mild to moderate fever, 1-2 days.

C.I.

- : Previous sensitivity to vaccine.
Infants less than 1 year of age.
? pregnancy (safety not established)
Draw back -
Only 50% effective.
Does not prevent carrier state.

Brand/Cost

BENGAL IMMUNITY

- : 10 ml amp: Rs 5.28
5ml vial: Rs 5.20

22.3.1.4

MEASLES VACCINEIndication

: Primary immunisation
(see schedule)

Preparation/Dose

: Prep: Hyperattenuated
Schwartz strain.
Each immunising dose has
1000 TCID₅₀ of live,
hyperattenuated virus.

S.E.

: Short febrile illness about
a week after immunisation.
Rarely febrile convulsion,
regional lymphadenopathy,
thrombocytopaenic purpura,
and pneumonia.

S.P.

: Store at 2° - 8° C.
Avoid light; use within one
hour of reconstitution.

C.I.

: Acute febrile illness;
active untreated tuberculosis;
eczema, articularia.
Immune deficiency states.
Pregnancy, children below
8 months. History of convulsion
allergy to egg, protein.

Brand/Cost

ROUVAX
(Institute Marieux)

: Single dose vial : Rs 10.00
10 doses vial: Rs 17.00

22.3.1.5

ORAL POLIO VACCINE (SABIN)Indication

: Routine immunization
(see schedule)

Preparation/Dose

: Trivalent vaccine containing
attenuated virus.
5ml vial (50 doses)
5ml vial (25 doses)
2ml vial (10 doses)
Dose: 0.1ml (2 drops) from
a 50 dose vial.
0.2ml (4 drops) from a 25
dose or 10 dose vial.
Oral, using a sterile dropper
or spoon.

S.E.

: Extremely rare risk of
paralytic polio due to
mutation and multiplication
of type 3 virus.

S.P.

: Store at 20° C to 60° C
for 2 years.
+ 4 to 8° C (6 months)
+18 to 22° C (3 weeks)
Do not freeze and thaw
repeatedly.
Do not sterilise spoon/dropper
with disinfectant, preferable
to boil spoon/dropper and cool.
Do not feed child with hot
fluid soon after or just before
dose; breast feeds may be given.

Brand/Cost

(MSD)

(SK&F)

22.3.1.6

TETANUS VACCINE (TETVAC)Indication

: Non-immune or partially immune individual with a risk of developing tetanus, eg., after road accidents.

Routine antenatal immunization (see immunisation schedule)

Preparation/Dose

: Dose: 0.5ml IM
2nd dose 6-12 weeks after the first and 3rd dose 6-12 months after the second.
Booster : every 5 years.
Amp. of 0.5ml
vials of 10 doses.

S.E.

: Mild pain and tenderness locally

Brand/Cost

(Glaxo)

22.3.2 OTHER VACCINES

22.3.2.1

TYPHOID (TAB) VACCINEIndication

: Primary immunisation (see immunisation schedule)
Those living in endemic areas.
Family contacts of patient with typhoid; hospital staff.

Preparation/Dose

: Dose: 0.5ml deep IM x 2 doses, at 4-6 weeks interval.
Booster every 1-3 years.
5ml vial.
10ml vial.

C.I.

: Pregnancy; immune deficiency conditions. (check with product literature).

S.E.

: Local pain and tenderness, malaise, headache, fever for 1-2 days.

S.P.

: Store at 2-4°C; do not freeze.

Brand/Cost

(Haffkine)

(Bengal Immunity)

: 10ml amp.: Rs 2.36

5ml vial: Rs 2.18

22.3.2.3

RABIES VACCINEIndication

: Prophylaxis and post-exposure treatment.

Preparation/Dose

: Human diploid cell vaccine

Vial of freeze dried vaccine containing a single dose along with a disposable syringe containing 1 ml of diluent.

Dose: 1ml deep SC for prophylaxis and injections at an interval of one month - booster 1 year later.
Post-exposure: 6 injections on day 0, 3, 7, 14, 30 & 90.

Purified chick embryo cell rabies vaccine

Dose: 6 doses of 1ml IM each on day 0, 3, 7, 14, 30 & 90.
Prophylaxis 3 doses on day 0, 28 and 56. Booster 1 year later.

Brand/Cost

HUMAN DIPLOID CELL : Inj : Rs 300.00 per ml.
VACCINE
(Merieux)

RABIPUR : Inj : Rs 130.00 per ml.
(Hoechst)

23. VITAMINS AND MINERALS

Vitamins are used for the prevention and treatment of specific deficiency states or where the diet is known to be inadequate. Their use as general "pick-me-ups" is of unproven value and in the case of preparations containing non-water soluble vitamins A or D, may actually be harmful, since they get accumulated in the body. Pyridoxine (B₆) deficiency may occur during isoniazid therapy. Severe deficiency of B group vitamins and encephalopathy as seen in chronic alcoholism are best treated by parenteral administration of B. vitamins. In the treatment of scurvy, it is rarely necessary to prescribe more than 100mg. of vitamin C daily, except initially. Claims that Vitamin C ameliorates colds or promotes wound healing have not been proved.

Calcium supplements are usually only required where dietary calcium intake is deficient. This dietary requirement varies with age and is relatively greater in childhood, pregnancy and lactation due to increased demand and in old age, due to impaired absorption. In hypocalcemic tetany intravenous injection of calcium gluconate is given. Patients with hypoparathyroidism rarely require calcium supplements after the early stages of stabilization on vitamin D. Oral phosphate supplements may be required in addition to Vitamin D in a small minority of patients with hypophosphataemic vitamin D resistant rickets. Aluminium containing and calcium containing antacids are used as phosphate binding agents in the management of renal failure but are contra indicated in hypo-phosphataemia. Adequate fluoride during the period of tooth development confers significant

resistance to dental caries. Where the natural fluoride contents of the drinking water is significantly less than 1 mg. per litre, artificial fluoridation is the most economical method. Regular application of fluoride to the teeth also reduces the incidence of dental caries.

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23. VITAMINS AND MINERALS

23.1 VITAMINS

23.1.1 VITAMIN AIndication

: For prevention and treatment of specific deficiency states such as Xerophthalmia; night blindness; Bilots spots.

Preparation/Route/Dose

: Vit A tabs: 50,000 I.U.
 Vit A Caps: 50,000 I.U.
 Inj: 50,000 IU/ml - 1ml amp
 Dose: For treatment 50,000 IU daily
 For prevention 4000 units daily.
 Drops: 150,000 Units per ml
 (30 drops)

S.E.

: Massive over dose can cause rough skin, dry hair, enlarged liver, rise of ESR and serum calcium and alk. phosphate.

S.P.

: Avoid excessive doses in pregnancy.

Brand/Cost

AROVIT Chewable Tab : 50,000 IU: Rs 5.32 for 8
 (Roche)
 Drops: 150,000 IU/ml: Rs 15.47
 for 7.5ml
 Inj : 100,000 IU/2ml: Rs 27.60
 for 6 amp.

AQUASO
 (USV & P)

: Cap : 50,000 IU: Rs 11.02 for
 30 caps
 Inj : 50,000 IU/ml, 2ml amp: Rs 1.86

23.1.2 VITAMIN B GROUP

23.1.2.1 VITAMIN B (THIAMINE HCl)

Indication : Severe deficiency states.
Encephalopathy as in chronic alcoholism; beriberi.

Preparation/Dose/Route : Tab : 25mg
Inj : 100mg/ml
Dose: 10-25mg/day
Severe deficiency: 200-300mg/day.

Brand/Cost

BERIN : Tab : 100mg: Rs 204.78 for 500
(Glaxo) Inj : 100mg/ml: Rs 9.17 for 10ml v

23.1.2.2 VIT. B₂ (RIBOFLAVINE)

Indication : Angular stomatitis

Preparation/Route/Dose : Tab : 5mg

Brand/Cost

RIBOFLAVIN : Tab : 10mg: Rs 7.95 for 100
(TCF)

(Tablet Pharma,
Bangarapet)

23.1.2.3 VIT. B₆ (PYRIDOXINE HCl)

Indication : Peripheral neuritis; adjuvant in treatment with INH.
Deficiency states.
Idiopathic sideroblastic anaemia
Pre-menstrual syndrome.

Preparation/Dose

: Tab : 10mg

Dose: INH neuropathy: prophylaxis
10mg OD.

Therapeutic: 50mg TID

Idiopathic sideroblastic
anaemia: 100-400mg daily in
divided doses.Brand/CostPYRIDOXINE
(British Pharma)

: Tab : 10mg: Rs 112.45 for 1000

Inj : 25mg/2ml: Rs 76.73 for 50 amps.

23.1.2.4 FOLIC ACIDIndication: Megaloblastic anaemia along
with B₁₂.

Anaemia of pregnancy.

Preparation

: Tab : 5mg

S.P.: May precipitate subacute combined
degeneration of the spinal cord
if used alone in pernicious
anaemia or other B₁₂ deficiency
state.Patients who may have folate
dependent tumours.Epileptic patients - occasionally
reduces plasma concentrations
of phenytoin.FOLIC ACID
(Beekay Pharma)

: Tab : 5mg: Rs 70.00 for 1000

(Ar-Ex)

: Tab : 5mg: Rs 55.00 for 1000

23.1.2.5 NICOTINAMIDEIndicationPreparation

: Tab : 50mg

23.1.2.6 VIT B₁₂ (HYDROXYCOBALAMIN)Indication

: Addisonian pernicious anaemia.
 Subacute combined degeneration of spinal cord.
 Other causes of Vit B₁₂ deficiency.
 Nitrous oxide induced megaloblastosis.

Preparation/Dose

: Inj : 500mcg/ml
 Dose: Initially 1mg repeated
 5 times at intervals of 2-3 days.
 Maintenance dose: 1mg every 3 months

Brand/Cost

MACRABIN
 (Glindia)

: Liquid: 35 microgram/5ml: Rs 3.55
 for 115 ml.

Inj : 500 microgram/ml: Rs 5.79
 for 5ml.

CYANOCOBALAMIN
 (Bengal Immunity)

: Inj : 500 microgram/ml: Rs 6.42
 for 10ml vial.

23.1.2.7 B-COMPLEXIndication

: Vit. B complex deficiency state.

Preparation/Dose

: Tab, liquid, inj.
 Dose as per instructions.

Brand/Cost

Complex - B
 (Glaxo)

: Tab : Rs 4.63 for 50

BECOSULES (Pfizer)	: Caps : Rs 9.03 for 20 Syrup: Rs 5.08 for 50ml
NEUROBION (E. Merk)	: Tab : Rs 1.65 for 100 Inj : Rs 132.25 for 50 amps.
TRIREDISOL (Merind)	: Rs 8.46 for 5ml vial.
VIT-B COMPLEX (IDPL)	: Syrup: Rs 7.44 for 110ml.

23.1.3 VIT. C (ASCORBIC ACID)

Indication

- : Scurvy
- Vit. C deficiency in elderly.
- Haemorrhagic diseases with increased capillary fragility.

Preparation/Route/ Dose

- : Tab : 100mg
- Dose: prophylactic: 25-50mg daily.
- Therapeutic: 250mg daily in divided doses.

Brand/Cost

ASCORBIC ACID
(CMS-I)

- : Tab : 100mg: Rs 60.00 for 1000

CELIN
(Glaxo)

- : Tab : 100mg: Rs 10.58 for 100

23.1.4 VIT. D

Indication

- : Vit. D deficiency states (Rickets; renal osteodystrophy).

Preparation/Route/
Dose

: Inj : 300,000 IU/ml
Granules: 600,000 IU/g.
Vit. A & D capsules
Vit. A - 6000 IU

Vit. D - 1000 IU

Dose: prevention - 400 units daily
Treatment - 40,000--200,000 Unit
Calcium levels to be monitored
periodically (weekly) when
pharmacological doses are given;
high dose combinations of calcium
and Vit. D are better avoided.

Brand/Cost

ARACHITOL
(Duphar)

: 300,000 IU: Rs 3.73 for 3 amp.

CALCIROL
(Cadila)

: Granules - 600,000 IU/gram:
Rs 2.37 for 1g sachet.

23.1.5 Vit.K.

Indication

: Deficiency in neonates.
Deficiency of Vit. K in biliary
obstruction.
For reversal of haemorrhage
caused by overdosage of anti-
coagulants.

Preparation/Dose

: Inj : 10mg/ml.

Brand/Cost

KAPILIN (K₃) : Inj : 10mg per ml: Rs 9.00 per 6 amp.
(Glindia)

KONAKION (K₁) : Tab : 10mg: Rs 8.24 for 100
(Glindia)

23.1.6 MULTIVIT. PREPS.

Indication : Deficiency state.

23.2 MINERALS

23.2.1 CALCIUM

Indication : Calcium deficiency during childhood.
Pregnancy and lactation.
Old age osteoporosis.
Patients with hypoparathyroidism.
Hypocalcaemic tetany.
Cardiac arrest.

Preparation/Dose : Tab : 300mg
Inj : 100mg/ml in 10ml amp.

S.E. : Bradycardia; arrhythmias;
irritation after IV injection.

C.I. : Parental calcium treatment;
contraindicated in patients
receiving cardiac glycosides.

Brand/Cost

CALCIUM SANDOZ
(Sandoz)

: Inj : 10%, 5ml amp: Rs 12.09 for 10
Syrup: Rs 4.31 for 85 ml
Calcium Sandoz + Vit. C, D and B₁₂
Tab : Rs 5.86 for 50.

CALCIUM GLUCONATE
(G.L. Pharma)

: Inj : 10%, 10ml amp: Rs 40.00 for
50 amp.

23.2.2 ZINCIndication

: Deficiency state.

Preparation/Dose

: Tablets

INSULIN

The commercially available preparations of insulin are mixtures of beef and pork pancreas. Newer insulins, prepared by purification of these mixtures (eg., Actrapid, Monotard) and human insulin, prepared by recombinant DNA technology, has recently been made available in India. Insulin is indicated in insulin dependent diabetes mellitus, gestational diabetes and complicated cases of non-insulin diabetes mellitus (ketosis, acute infection, surgery and failure of sulfonylureas).

Insulin preparations are broadly classified as rapid acting (soluble insulin), intermediate acting (lente insulin) and slow acting (ultralente insulin). The choice of insulin depends on patient compliance, ease of administration and phase of therapy. Soluble insulin is used (2-3 times daily) in the initiation phase and is useful in arriving at the daily insulin requirement. Doses are titrated against urine or blood sugars. In the maintenance phase, the patient is switched onto an intermediate acting insulin (usually lente) to reduce the frequency of injection, for tight control of blood sugars throughout the day, mixtures of soluble and lente insulin are given as two doses (morning and late evening) per day.

The older preparations are fairly unstable and require care in storage, preparation and mixing. The vial should be refrigerated or stored in a clay pot filled with sand and water. Insulin should not be stored in ice. Patients should be taught the technique of self-injection, measurement of dose, stressing the need for proper sterilization of syringes and needles.

The side effects of older insulins are hypoglycemia, lipodystrophy and immunologic reactions. Hypoglycemia can be prevented by careful adjustment of dose, regular meals and avoidance of sudden exercise. Lipodystrophy, insulin allergy and insulin resistance can be reversed by changing to a newer insulin.

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Insulin preparations

(depending on speed and duration of action following subcutaneous injection)

Class	Preparation	Duration of action in hours	
		onset	duration
Fast acting	Insulin injection (regular insulin)	1	6
	Prompt insulin Zinc suspension (semilente insulin)	1	14
Intermediate acting	Globin insuling	2	18
	Isophase insulin suspension (NPH insulin)	2	24
	Insulin zinc suspension (Lente insulin)	2	24
Long acting	Protamine zinc insulin suspension	7	36
	Extended insulin zinc suspension (ultralente)	7	36

These are mainly indicated for their immuno suppressant effects suppressing disease processes and for replacement therapy.

REPLACEMENT THERAPY: In deficiency states, physiological replacement is best achieved with a combination of oral hydrocortisone and mineralo corticoid - fludrocortisone. Hydrocortisone alone does not provide sufficient mineralocorticoid activity. The more potent synthetic glucocorticoids such as fludrocortisone along with prednisolone is practicable.

For suppression of disease process, betamethasone, dexamethasone, hydrocortisone prednisolone are used for their anti-inflammatory effect.

Equivalent doses of glucocorticoid

<u>Drug</u>	<u>Equivalent anti-inflammatory dose</u> <u>(in mg.)</u>
Betamethasone	0.75
Cortisone	25.00
Dexamethasone	20.75
Hydrocortisone	20.00
Prednisone	5.00
Prednisolone	5.00
Triamcinolone	4.00

High potency is of no advantage but effect on water and electrolyte is of significance. Prednisolone, the commonest used is given orally. All are given in divided doses for continuous effect. They are also used for acute hypersensitivity reaction, anaphylactic shock and as an adjunct with adrenaline. These are also indicated in emergency treatment of acute severe asthma. They are used in autoimmune diseases such as rheumatoid arthritis, lupus erythematosus etc. Corticosteroids reduce antibody formation and hence may be used to suppress or modify allergic reactions.

DISADVANTAGES: Prolonged use results in Cushing's syndrome, altered glucose tolerance hypersensitivity, osteoporosis, mental disturbances, muscle weakness. There may be growth retardation in children, increased susceptibility to infections

Exogenous corticosteroids suppress corticotrophin and may lead to adrenal atrophy which can persist for years. Withdrawal of steroid therapy must be done in a graded manner to avoid symptoms of acute adrenal insufficiency.

DRUG INTERACTIONS: Concomitant administration with antihypertensive drugs result reduced antihypertensive effect; with aspirin there is enhanced gastric irritation and decreased diuretic effect and hypokalaemia with diuretics.

FEMALE SEX HORMONES

Oestrogens are now used as oral contraceptives with progestogens since oestrogens suppress ovulation and inhibit production of follicle stimulating hormone (FSH) thereby inhibiting ovulation. They may also be used with benefit in cases of prostatic cancer and breast cancer. Several gynaecological disorders such as premature ovarian failure, dysfunctional uterine bleeding and spasmodic dysmenorrhoea also benefit from oestrogen-progesterone cyclic combinations but the risk of thrombo-embolism should be kept in mind. Hormone replacement therapy is not routinely recommended in post-menopausal women but small doses of oestrogen given for long periods will diminish post-menopausal osteoporosis. A short course can also be tried in menopausal vasomotor symptoms, and topical preparations in severe atrophic vulvo-vaginitis. Progesterone should be added cyclically in these post-menopausal women to prevent a possible endometrial carcinoma, except in those who have undergone a hysterectomy. Oestrogens are no longer used to suppress lactation because of the risk of thrombo-embolism. Other side effects include nausea, weight gain, mastalgia, headache and changes in liver function.

Ethinylestradiol is the oestrogen of choice for most conditions. ~~St~~ibesterol is used mainly in neoplastic conditions. The natural oestrogens have not been shown to have any advantages over synthetic preparations. Subcutaneous or transdermal administration of synthetic preparations closely mimic endogenous hormonal activity.

PROGESTOGENS

Progestogens modify some of the effects of oestrogens and act mainly on tissues sensitised by them; their effects are inhibited by excess of oestrogens. There are two main groups of progestogen, the naturally occurring hormone progesterone and its analogues (allyloestrenol, Hydrogesterone, hydroxyprogesterone and medroxy progesterone) and the testosterone analogues e.g., norethisterone. Progesterone and its analogues are less androgenic than testosterone derivatives and neither progesterone nor hydrogesterone causes virilisation. Other synthetic derivatives are variably metabolised into testosterone and oestrogen; thus side effects vary with the preparation and the dose.

Progestogens are useful in many menstrual disorders, including severe dysmenorrhoea, dysfunctional uterine bleeding and in premenstural syndrome. Norethisterone may be used alone on a cyclical basis during part of the menstrual cycle or in conjunction with oestrogens. Progesterones can be used in the treatment of endometriosis. Hydroxyprogesterone hexanoate - a true progesterone derivative - has been used in habitual abortion but its efficacy is doubtful.

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24. ENDOCRINES

24.1 ANTIDIABETIC AGENTS

24.1.1 INSULIN

24.1.1.1 INSULIN (Soluble; Plain: Neutral)

<u>Indication</u>	: Diabetes Mellitus; diabetic retoacidosis (short acting) (Maximum effect 2-4 hours and can last up to 8 hours).
<u>Preparation/Dose Route</u>	: Dose and route according to patient's requirement, usually SC; IM or IV as required. 40 Units/ml vial 80 Units/ml vial
<u>S.E.</u>	: Over dose causes hypoglycaemia. Local reactions (during first few weeks of treatment) and lipo-atrophy at injection site occur. Local reactions usually transient and require no treatment. (reduce dose in renal impairment).
<u>Brand/Cost</u>	
INSULIN (Boots)	: Inj : 40 units - 10ml vial: Rs 12.44
ACTRAPID (Novo)	

24.1.1.2 INSULINISOPHANE (-NPH)

Indication : Diabetes Mellitus (intermediate acting).
Onset of action: 1-2 hours,
Max effect: 4-12 hours
Duration of action: 16-24 hours

Preparation/Route/
Dose : 40 Units/ml vial
SC according to requirement.
Not suitable for IM or IV use.
(Can be mixed with neutral insulin in the syringe).

Brand/Cost

INSULIN ISOPHANE : Inj : 40 units, 10ml vial: Rs 12.49
(NPH (Boots))

24.1.1.3 INSULIN PROTAMINE ZINC (PZI)

Indication : Diabetes Mellitus
(Prolonged action: duration of action: 16-35 hours).

Preparation/Dose/
Route : 40 units/ml
SC according to requirement.

S.P./C.I. : Should not be mixed with soluble Insulin in the syringe.
Not suitable for IM or IV use.

Brand/Cost

INSULIN
PROTAMINE ZINC : Inj : 40 units, 10ml vial: Rs 12.
(Boots)

24.1.1.4 INSULIN ZINC (LENTE)

Indication : Diabetes Mellitus
 (Long acting)
 (Can be mixed with soluble insulin)
 Onset - 1-2 hours. Max effect: 4-12
 hours; duration: 16-24 hours.

Preparation/Dose/
Route : 40 units/ml vial
 80 units/ml vial
 SC as per requirement.

Brand/Cost

INSULIN ZINC (LENTE): Inj : 40 units, 10ml vial: Rs 12.43
 (Boots)

MONOTARD
 (Novo)

24.1.2 ORAL ANTIDIABETICS

24.1.2.1 CHLORPROPAMIDE (Sulphonyl urea)

Indication : Diabetes Mellitus
 (Type 2; NIDDM)
 Diabetes insipidus.

Preparation/Dose/
Route : Tab : 100mg & 250mg
 Dose: 250mg daily with breakfast.
 (Elderly patients: 100-125mg OD;
 better avoided in the elderly)
 Max: 500mg daily.

S.P.

: Avoid during pregnancy and breast feeding. Caution in elderly and those with renal failure. Can cause prolonged hypoglycaemia. Substitute with Insulin therapy during intercurrent illness (myocardial infarction, coma, infection, trauma) and during surgery.

S.E.

: Gastro-intestinal disturbances, headache, facial flushing after alcohol.

C.I.

: In presence of ketoacidosis.

Brand/Cost

DIABENESE
(Pfizer)

: Tab : 100mg: Rs 1.38 for 10
250mg: Rs 2.10 for 10

24.1.2.2

GLIBENCLAMIDE (Sulphonylurea)Indication

: NIDDM: Type 2 diabetes
(Duration of action between tolbutamide and chlorpropamide)

Preparation/Dose

: Tab : 5mg
Dose: 5mg daily.
Elderly: 2.5mg daily.
Dose adjusted according to response
Max. 20mg daily (taken with breakfast); may be given in divided doses B.D.

SE/S.P/C.I

: As under Chlorpropamide: 24.1.2.1

Brand/Cost

GLIBENCLAMIDE : Tab : 5mg: Rs 110.00 for 1000
(CMS-I)

DAONIL : Tab : 5mg: Rs 8.88 for 100
(Hoechst)

EUGLUCON : Tab : 5mg: Rs 8.88 for 100
(Boehringer Knoll)

24.1.2.3 GLIPIZIDE (Sulphonyl urea)

Indication : Type 2 diabetes
(Duration of action similar
to Glibenclamide)

Preparation/Route/
Dose : Tab : 5mg
Dose: 2.5mg adjusted according
to response. Max: 40mg daily
upto 15mg may be given as a
single dose before breakfast.
--higher dose --divided.

S.P./C.I. : As under Chlorpropamide: 24.1.2.1

Brand/Cost

GLYNASE : Tab : 5mg: Rs 4.00 for 10
(USV)

24.1.2.4 TOLBUTAMIDE (Sulphonylurea)

Indication : Type 2 diabetes
(short duration of action)

Preparation/Dose/
Route : Tab : 500mg: 1g.
500mg - 1.5g (max 2g daily)
in divided doses.

S.E. : As under Chlorpropamide: 24.1.2.1

Brand/Cost

RASTINON : Tab : 0.5mg: Rs 25.00 for 100
(Hoechst)

24.1.2.5 METFORMIN (Biguanide)

Indication : Type 2 diabetes, especially
over weight patients.

Preparation/Route/
Dose : Tab : 0.5g

S.E. : Anorexia; nausea; vomiting;
diarrhoea, lactic acidosis
(especially in renal failure);
decreased Vit. B₁₂ absorption.

C.I. : Renal or hepatic failure.
Predisposition to lactic acidosis
heart failure; severe infection or
trauma; dehydration; alcoholism.

Brand/Cost

GLYCIPHAGE : Tab : 0.5g: Rs 2.79 for 8
(Franco Indian)

24.2 ADRENAL HORMONES & SYNTHETIC SUBSTITUTES

24.2.1 BETAMETHASONE

Indication : Status asthmaticus; suppression
of inflammatory and allergic
disorders; cerebral oedema;
congenital adrenal hyperplasia.

Preparation/Dose : Tab : 0.5mg
 Inj : 4mg/ml
 Drops: 0.5mg/ml
 Dose: 0.5-5mg, daily; reduce to maintenance.
 Inj : 4-20mg IM, IV or SC repeated 3-4 times daily if required. 1-8mg intra articular.
 Child: 0.2-0.5mg/kg in divided doses.

S.E. : Adrenal suppression; Cushing's syndrome with moon face; striae and acne.

S.P. : When treatment is to be discontinued, dose should be tapered gradually.

C.I./Caution : Tuberculosis; herpes simplex; systemic fungal infections; active peptic ulcer; local or systemic infections unless controlled. Diabetes mellitus, osteoporosis, glaucoma, diverticulitis; myasthenia gravis, hypertension, cardiac failure. Renal and hepatic insufficiency.

Brand/Cost

BETNESOL
 (Glaxo) : Tab : 0.5mg: Rs 2.55 for 10
 Inj : 4mg/ml: Rs 3.11 for 1 ml.

24.2.2

DEXAMETHASONE

Indication : As for Betamethasone

Preparation/Dose : Tab : 0.5mg
 Inj : 4mg/ml - 2ml vial.
 Dose: Emergency: start with 1ml inj
 Child: 0.2mg/kg/dose IM or IV
 Tab: 0.5mg/kg in divided doses.
 Inj : (shock pack): 20mg/5ml vial.

S.F./S.P./C.I. : As for Betamethasone

Brand/Cost

DECADRON : Tab : 0.5mg: Rs 2.21 for 10
 (Merind) Inj : 4mg/ml: Rs 8.88 for 2ml vial

IDIZONE : Tab : 0.5mg: Rs 7.51 for 10
 (IDPL) Inj : 4mg/ml: Rs 4.33 for 2ml vial.

DEXONA SHOCK PACK : Inj : 20mg/ml: Rs 30.04 for 5ml
 (Cadila)

24.2.3

HYDROCORTISONE SODIUM SUCCINATE

Indication : Adrenocortical insufficiency;
 suppression of inflammatory and
 allergic disorders; shock;
 collagen diseases; status
 asthmaticus.

Preparation/Dose : Inj : 100mg/5ml up to 1g/day
 Child: 5mg/kg/dose

S.P./C.I. : As for Betamethasone.

Brand/Cost

EFCORLIN Soluble : 134mg/vial: Rs 14.00 per vial
 (Allenbury)

LYCORTIN S : Inj : 100mg: Rs 9.24
 (Lyka)

24.2.4 HYDROCORTISONE ACETATE

<u>Indication</u>	: To be given intra-articular Intradermal Intrapleural and sub- conjunctival injection.
<u>Preparation/Dose</u>	: 25mg/ml 5ml vial.
<u>S.P.</u>	: Not to be given IV, IM or S/C.
<u>Brand/Cost</u>	
WYCORT (Wyeth)	: 25mg/ml: Rs 9.18 for 5ml.

24.2.5 PREDINSOLONE

<u>Indication</u>	: Suppression of inflammatory and allergic disorders.
<u>Preparation/Dose</u>	: Tab : 5mg, 10mg Inj : 20mg/ml, 3ml vial
<u>S.P./S.E./C.I.</u>	: As for Betamethasone (Injection not for IV use)
<u>Brand/Cost</u>	
WYSOLONE (Wyeth)	: Tab : 5mg: Rs 3.09 for 10 Tab : 10mg: Rs 5.95 for 10
DELTACORTIL (Pfizer)	: Tab : 5mg: Rs 3.09 for 10 10mg: Rs 6.13 for 10

24.2.6 TRIAMCINOLONE

<u>Indication</u>	: Suppression of inflammatory and allergic disorders.
<u>Preparation/Dose</u>	: Inj : 10mg/ml 40mg/ml Dose: 2.5-15mg intra-articular 0.1-0.3ml intradermal.

S.P.

: Not to be given IV; not for children under 6 years.

Brand/Cost

KENACORT
(Sarabhai)

: Tab : 1mg: Rs 4.02 for 10
4mg: Rs 13.07 for 10
Inj : 10mg: Rs 12.07 for 1ml
40mg: Rs 28.16 for 1ml.

24.3 ANDROGENS

24.3.1 TESTOSTERONE

Indication

: Hypogonadism; male climacteric; senile osteoporosis; carcinoma breast in premenopausal female.

Preparation/Dose : Inj : 25mg/ml, 50mg/ml, 100mg/ml
200mg/ml.
1ml ampoule.

Dose: See literature with product.

C.I.

: Prostatic cancer, pregnancy, ischaemic heart disease, breast feeding, nephrosis.

S.E.

: High doses cause virilism in women and suppress spermatogenesis in men. Oedema, increase in weight, hypercalcaemia; increased bone growth; priapism; premature closure of epiphysis in early puberty. Prostatism in elderly patients; cholestatic type of jaundice.

Brand/Cost

TESTANON-25
(Infar)

: Inj : 25mg/ml: Rs 4.65 per amp.

TESTOVIRON DEPOT
(German Remedies)

: Inj : 100mg/ml: Rb 175.00
for 10 amp.
250mg/ml: Rb 330.00
for 10 amp.

PROVIRONUM
(German Remedies)

: Tab : 25mg: Rb 141.21 for 30

24.4. OESTROGENS

24.4.1 STILBOESTEROL

Indication

: Post menopausal breast cancer.
Prostatic carcinoma.
Suppression of lactation.

Preparation/Dose

: Tab : 5mg
Dose: Breast cancer: 10-20mg
daily
Prostatic cancer: 1-3mg
daily.

S.E.

: Nausea, vomiting, weight gain,
sodium retention, jaundice,
rashes, headache.

C.I.

: History of thromboembolism;
hepatic impairment;
endometriosis; undiagnosed
vaginal bleeding.

Caution

: Pregnancy, breast feeding,
diabetes, epilepsy, hypertension,
cardiac or renal disease,
history of jaundice.

Brand/Cost

STILBOESTROL
(Cooper Pharma)

: Tab : 5mg: Rb 25.00 for 1000

24.4.2

STILBOESTROL DIPHOSPHATEIndication

: Prostatic cancer.

Preparation/Dose

: Tab : 100mg

Inj : 50mg/ml, 5ml amp.

Dose: 100-200mg, 3 times daily,
reducing to 100-300mg daily.I.V.: slow IV inj. 552-1104mg daily
or 5 days at least then
maintenance 276mg, 1-4times weeklyBrand/CostHONVAN
(Khandalwal)

: Inj : 50mg/ml: Rs 182.35 for 10

Tab : 0.1mg: Rs 90.42 for 20

24.4.3

ETHINYLOESTRADIOLIndication: Disturbances in menstrual
cycle; dysfunctional uterine
bleeding; delay in menstruation;
menopausal symptoms.Preparation/Dose

: Tab : 0.05mg ethinyloestradiol.

S.E.: Nausea, vomiting, weight gain,
breast enlargement and tenderness
withdrawal bleeding, sodium
retention with oedema, jaundice,
rashes, depression, headache,
endometrial cancer in post-
menopausal women.C.I.: Oestrogen dependent cancer;
history of thromboembolism;
hepatic impairment; endometriosis
undiagnosed vaginal bleeding.
Caution as under stilboesterol.

Brand/Cost :
 ORGALUTIN : Tab : Rs 9.05 for 10
 (Infar)

24.4.4 OESTROGENS--CONJUGATED

Indication : As under 24.4.3

Preparation/Dose : Tab : 625 micrograms.
 Dose: Menopausal symptoms
 (short term): 0.625-1.25mg daily
 for 21 days from 5th day of
 cycle, repeated after 7 days
 if necessary.

Brand/Cost

PREMARIN : Tab : 1.25mg: Rs 35.30 for 20
 (Manners) 0.625mg: Rs 22.72 for 20
 Inj : Rs 55.41 for 20ml vial.

24.5 PROGESTOGENS

Indication : Dysfunctional uterine bleeding,
 primary and secondary amenorrhoea,
 endometriosis; pre-menstrual
 syndrome; polymenorrhoea;
 habitual and threatened abortion
 and endometrial cancer.

S.E. : Nausea, vomiting, headache,
 muscle cramps, scanty menstruation,
 virilism.

C.I. : Idiopathic jaundice, herpes,
 severe liver disorders,
 thromboembolic disorders,
 severe pruritus of pregnancy.

24.5.1 ALLYLOESTRENOLIndication

: As under 24.5

Preparation/Dose

: Tab : 5mg

Dose: 5-10mg daily for
atleast 16 weeks.S.P./C.I.

: as above

Brand/CostGESTANIN
(Infar)

: Tab : 5mg: Rs 16.90 for 10

24.5.2 LYNOESTRENOLIndication

: as above.

Preparation/Dose

: Tab : 5mg

Dose: varies with condition

S.P./C.I.

: As above

Brand/CostORGAMETRIL
(Infar)

: Tab : 5mg: Rs 15.75 for 10

24.5.3 NORETHISTERONEIndication

: As above

Preparation/Dose

: Tab : 5mg

Dose: as per indication

S.P./C.I.

: As above

Brand/CostPRIMOLUT-N
(German Remedies)

: Tab : 5mg: Rs 117.00 for 100

24.5.4 HYDROXYPROGESTERONE CAPROATE

<u>Indication</u>	: As for progestogens
<u>Preparation/Dose</u>	: Inj : 125mg/ml - 1ml amp. 250mg/ml - 1ml amp 500mg/ml - 1ml amp Dose: 250-500mg IM weekly during first half of pregnancy.
<u>S.P./C.I.</u>	: As for Progestogens
<u>Brand/Cost</u>	
PROLUTON DEPOT (German Remedies)	: Inj : 125mg: Rs 95.40 for 10 amp 250mg: Rs 198.00 for 10

24.5.5 MEDROXYPROGESTERONE

<u>Indication</u>	: As for progestogens.
<u>Preparation/Dose</u>	: Tab : 5mg; 10mg Dose: varies with the indication.
<u>S.P./C.I.</u>	: As for progestogens.
<u>Brand/Cost</u>	
FARLUTAL (Walter Bushnell)	: Tab : 10mg: Rs 28.12 for 10

24.6 OVULATION INDUCERS

24.6.1 CLOMIPHENE CITRATE

<u>Indication</u>	: Anovulatory infertility.
<u>Preparation/Dose</u>	: Tab : 50mg Dose: 50mg daily for 5 days starting on 5th day of menstrual cycle or at any time if cycles have stopped.

Maximum six courses.

Dose may be increased by 50mg each month. Max. 200mg daily for 5 days.

S.E.

: Visual disturbances, ovarian hyperstimulation, hot flushes, abdominal discomfort, nausea, vomiting, insomnia, breast tenderness, weight gain, rashes, dizziness, hair loss.

C.I.

: Hepatic disease, ovarian cyst, endometrial cancer, pregnancy, abnormal uterine bleeding.

Brand/Cost

FERTYL Tab
(Ar-Ex)

: Tab : 25mg: Rs 200.00 for 80

PERTOMID
(Cipla)

: Tab : 25mg: Rs 75.00 for 10

24.7 BROMOCRIPTINE

Indication

: Suppression of lactation, amenorrhoea, galactorrhoea and infertility due to hyperprolactinaemia; parkinsonism.

Preparation/Dose

: Tab : 25mg

S.E.

: Nausea, vomiting, drowsiness, headache, postural hypotension, dyskinesia, dry mouth, leg cramps, pleural effusion; retroperitoneal fibrosis.

S.P.

: Impaired hepatic or renal function, peptic ulcer, diabetes, psychosis or severe cardiovascular disease.

C.I.

: Sensitivity to ergot alkaloids.

Brand/Cost

PROCTINAL
(Biddle Sawyer)

: Tab : 25mg: Rs 222.00 for 30

B-CRIP
(Chemech)

: Tab : 2.5mg: Rs 57.50 for 10

24.8 THYROID HORMONES & ANTITHYROID DRUGS

24.8.1 THYROXINE SODIUMIndication

: Hypothyroidism

Preparation/Dose

: Tab : 0.1mg

Dose: 0.05-0.1mg initially increasing by 0.05 at 2-4 weeks intervals. Usual maintenance dose: 0.1-0.2mg daily as a single dose.

Children/infant: 0.025-0.05mg/day.

S.P.

: Elderly and those with cardiac disease.

Brand/Cost

ELTROXIN
(Allenburys)

: Tab : 0.1mg: Rs 11.00 for 100

ROXIN
(Cadilla)

: Tab : 0.1mg: Rs 7.37 for 100

24.8.2

CARBIMAZOLEIndication

: Thyrotoxicosis,
preparation for thyroidectomy

Preparation/Dose

: Tab : 5mg
Dose: Initially 15-45mg/day in
divided dose till euthyroid,
then reduce to maintenance
dose: 5-15mg daily.

S.P.

: Large goitre, pregnancy,
breast feeding.
Blood count to be done regular

S.E.

: Agranulocytosis, jaundice,
nausea, rashes, arthralgia,
alopecia rarely.

Brand/Cost

NEO-MERCAZOLE
(Nicholas)

: Tab : 5mg: Rs 47.34 for 100

24.8.3

POTASSIUM IODIDE (Lugol's Iodine)Indication

: Thyrotoxicosis, pre-operative
preparation.

Preparation/Dose

: 5% and 10% solution in water
Dose: 0.1-0.3ml TID--10-14 d

S.E.

: Hypersensitivity reactions.

Caution

: Pregnancy.

C.I.

: Breast feeding.

24.9 HYPOTHALMIC AND PITUITARY HORMONES

24.9.1 CLOMIPHENE CITRATE : See 24.6.1

24.9.2 ACTH (CORTICOTROPHIN)

Indication

: As diagnostic agent to assess adrenal function.
Long acting depot forms may be used as an alternative to corticosteroids in conditions such as Crohns disease or rheumatoid arthritis, advantages being less adrenocortical suppression and less growth retardation.

Preparation/Dose

: Dose: By SC or IM inj.
initially 40-80 units daily--
reducing according to response.

Brand/Cost

ACTHAR GEL
(Rorer)

24.9.3 TETRACOSACTRIN

Indication

: As for ACTH

Preparation/Dose

: Inj : 250micrograms/ml
Dose: diagnostic by IM
injection 250 micrograms as a
single dose.

Depot Inj. 1000 micrograms (1mg)/ml by IM inj. initially 500-1000 micrograms twice weekly or in acute conditions daily x 3 days and then adjusted according to response. Child up to 1 year: 250 micrograms daily and adjusted according to response.

S.P./C.I.

: As for ACTH

Brand/Cost

SYNACTHEN

(Ciba)

SYNACTHEN (DEPOT)

(Ciba)

: Currently not available in the country.

24.9.4

CHORIONIC GONADOTROPHIN

(HCG)

Indication

: Delayed puberty in male and oligospermia associated with hypopituitarism (not in primary gonadal failure) Recurrent abortion. Premenstrual syndrome.

Preparation/Dose

: 1000 IU freeze dried powder solvent in separate amps. Available as 2,000 and 5,000 ampoules. Dose: according to patient requirement.

S.E. : Oedema (particularly in males),
headache, tenderness, mood changes,
local reactions, sexual precocity
with high doses.

S.P. : Cardiac or renal impairment,
asthma, epilepsy, migraine.

Brand/Cost

GONADOTRAPHON-L.H.
(Biochem) : Inj : 1000 IU: Rs 82.05 for 3 amp.

PROFASI
(Serum Institute) : Inj : 1000 IU: Rs 257.80 for 3 amps.
2000 IU: Rs 272.05 for 3 amps
5000 IU: Rs 146.09 for 1 amp

24.9.5

FOLLICLE STIMULATING HORMONE (FSH)

Indication : Infertile women with proven
hypopituitarism.
Delayed puberty.
Defective spermatogenesis.

Preparation/Dose : 1000 IU freeze dried powder and
solvent in separate ampoules.
Dose: according to patient's
response.

S.E. : Ovarian hyperstimulation; multiple
pregnancy; local reactions.

C.I. : Pregnancy

S.P. : Ovarian cysts; adrenal or thyroid
disorders; intracranial lesions.

Brand/Cost

GONADOTRAPHON FSH
(Biochem) : Inj : 1000 IU: Rs 231.30 for 3 amp.

24.9.6

VASOPRESSIN (ADH)Indication: Diabetes insipidus;
variceal bleeding.Preparation/Dose: Injection, S.C/IM.
5-20 units every 4 hours.
Variceal bleeding:
IV 20 units over 15 minutesS.E.: Pallor, nausea, cramps,
hypersensitivity reaction
constriction of coronary
arteries.C.I.: Vascular disease, chronic
nephritis.Caution: Heart failure, asthma,
epilepsy, migraine.
Adjust fluid intake.Brand/CostPITRESSIN
(Parke Davis & Co)

: Inj : Rs 477.90 for 10 amp

24.9.7

OXYTOCINIndication

: As under 22.2

Brand/CostPITOCIN
(P.D. & Co)

: Inj : 6.72 for 6 amp.

SYNTOCINON
(Sandoz): Inj : 5 IU per ml: Rs 6.
for 6 amps
2 IU per 2ml: Rs 7
for 6 amps.

24.10 OTHER ENDOCRINE DRUGS

24.10.1

BROMOCRIPTINE

: See 24.7

24.10.2

DANAZOLIndication

: Endometriosis; menorrhagia and other menstrual disorders; mammary dysplasia; gynaecomastia. Long term management of hereditary angioedema (drug of choice).

Preparation/Dose

: 50mg, 100mg & 200mg capsules.
Dose: Endometriosis and associated infertility: 200-400mg daily for 3-6 months in 2-4 divided doses. Breast disorders: 100-400mg daily for 3-6 months.
Menorrhagia: 100-400mg daily (usual 200mg) for 3 months and then renew.

S.E.

: Nausea, dizziness, rashes, backache, flushing, skeletal muscle spasm, hair loss, mild androgenic effects. Thrombocytopaenia rarely.

S.P.

: Cardiac, hepatic or renal impairment, epilepsy, diabetes, migraine, lactation.

C.I.

: Porphyria, pregnancy.

Brand/Cost

DANOGEN
(Cipla)

LADOGAL
(Win-Medicare)

: Caps: 50mg: Rs 160.00 for 30

: Caps: 50mg : Rs 197.10 for 30
100mg: Rs 369.00 for 30
200mg : Rs 654.00 for 30

24.11 CONTRACEPTIVES

24.11.1 ORAL CONTRACEPTIVES

COMBINED ORAL CONTRACEPTIVES

Best to start with a pill which contains 0.05mg or less of oestrogen. After a few cycles a pill containing less oestrogen (0.02mg to 0.03mg) or a triphasic pill may be prescribed.

(Progestogen only pills are not yet available in India)

(Stop pill after 2-3 years of continuous use).

S.E.: Minor--nausea, vomiting, weight gain, oedema, fluid retention, breast fullness, tenderness, headache, intermenstrual spotting, break-through bleeding, scanty bleeding, vaginitis, moniliasis, erosion cervix, leucorrhoea, depression, acne, chloasma, cornual oedema, hypertrophic gingivitis, leg cramps, urticaria, alopecia (rare).

Major--thrombo-embolism (pelvis, lungs, brain), thrombophlebitis, coronary thrombosis, myocardial infarction, neurovascular complication, cerebrovascular accidents.

C.I.: Absolute

1. Thromboembolic disorders or history thereof.
2. Cardiovascular accidents or history thereof.
3. Active liver disease

4. Known or suspected malignancy of breast or reproductive system.
5. Known or suspected oestrogen dependent neoplasia.
6. Obstructive jaundice in pregnancy.
7. Pregnancy
8. Lactation
9. Hypercholesterolaemia
(above 300mg/100ml fasting)
10. Congenital hyperlipidaemia
11. Undiagnosed genital bleeding
12. Excessive smoking
13. Overweight by 120%

Relative (strong)

1. Migraine headaches
2. Hypertension
3. Epilepsy
4. Neuro-ocular lesions
5. Diabetes or family history thereof
6. Gall bladder disease
7. History of cholestasis during pregnancy
8. Delivery within past four weeks
9. Uterine fibroids
10. Mononucleosis
11. Women over 35 years

Other contra indications:

1. Varicose veins
2. Bronchial asthma
3. Cardiac or renal disease
4. Mental retardation
5. Depression

- 6. Cholasma
- 7. Late menarche or irregular periods
- 8. Previous history of anovulation
or infertility
- 9. Before elective surgery

Practical instructions to the pill user

1. Begin the first pill on the first Sunday after the periods.
2. Swallow one pill a day, preferably at meal time or before going to bed.
3. If it is a 21 day pack begin a new pack on the first Sunday after stopping the old pack
4. If it is a 28 day pack begin a new pack immediately without interruption
5. Use the second back up method (condom or post-coital vaginal pessary) during the first month.
6. Use the second method in an emergency (missed pill)
7. If you miss taking

one pill: take it as soon as you remember plus the one for that day at the regular time.

two pills: take the two pills as soon as you remember and two pills the next day. Then one pill a day as scheduled.

three or more: you may become pregnant.

Throw away the half used pack of pills and start a new pack on the first Sunday after you missed the pill, even if you are bleeding.

Use the second method while you are off pills and also for the first two weeks while you are on the new pack.

8. If you miss your period
If you miss one or more pills and skip a period, consult your doctor for a pregnancy test.
9. If you do not miss a pill and skip a period:
although you are not likely to be pregnant consult your doctor. Start the new pack only after ruling out pregnancy and use the back up method until then.
10. Consult your doctor if there is vaginal spotting or irregular bleeding.
11. You require a complete physical examination every six months while you are on the pill.
12. If you see any doctor for any problem mention that you are on the contraceptive pill.

Brand/Cost

<u>HIGH DOSE PILL</u>	MINOVLAR ED x 28 (Schering)	: Ethinyloestradiol 0.5mg Norethisterone acetate 1.0mg
	OVRAL x 21 (Wyeth)	: Ethinyloestradiol 0.5mg Norgestral 0.5mg Tab : Rs 5.00 for 21
<u>LOW DOSE PILL</u>	OVRAL-L x 21 (Wyeth)	: Ethinyloestradiol 0.03mg Norgestral 0.3mg Tab : Rs 5.00 for 21
	<u>TRIPHASIC PILL</u>	
	TRIQUILAR x 21 (Schering)	: Ethinyloestradiol Levonorgestrel 6 brown, 5 white and 10 ochre tabs: Rs 7.50 for 21 (one course).

NATIONAL TUBERCULOSIS CONTROL PROGRAMME

GOVERNMENT OF INDIA

Long term:

1. Regimen TB : Thioacetazone (T): 150mg
INH (H) : 300mg
taken orally at a time after meal
daily for 12-18 months.
2. Regimen SH (TW): Streptomycin (S): 0.75g IM
INH (H): 600-700mg orally
Twice a week (3 & 4 days interval)
for one year (104 doses)
Pyridoxine: 10mg biweekly to prevent
neuritis.
3. Regimen EH : Ethambutol (E): 800mg for patients
weighing less than 50kg and 1200mg for
those with weight more than 50kg.
INH (H): 300mg
orally, daily after meal for 12-18 month
4. Biphasic regimen: Initial intensive phase (3 drugs)

Streptomycin: 0.75g IM		
Thioacetazone: 150mg		
INH : 300mg		oral

or

Streptomycin: 0.75g IM		
Ethambutol : 800/1200mg		
INH : 300mg		oral

daily for 2 months

Followed by (2 drugs)

Thioacetazone : 150mg)		
INH : 300mg)		oral

or

Ethambutol : 800/1200mg)		
INH : 300mg)		oral

daily for 10-16 months.

- Note: 1. The biphasic regimen is preferred
 2. Doses stated are for adults
 3. Optimum period of treatment is 18 months
 (minimum : 12 months)

Short course:

1. Policy A: 2 S₂ H₂ R₂ Z₂ / 4 H₂ R₂

Intensive phase (4 drugs)

Streptomycin	: 0.75g IM	
INH	: 600mg	} oral
Rifampicin	: 600mg	
Pyrazinamide	: 2g	

Twice a week for 8 weeks.

Followed by (2 drugs)

INH	: 600mg
Rifampicin	: 600mg

Orally, twice a week after meal for 4 months.

Total period 6 months.

When streptomycin is not tolerated, Ethambutol 1.6g twice a week can be substituted.

2. Policy B: 2 EHRZ/6 TH

Initial phase (4 drugs)

Ethambutol	: 1g
INH	: 300mg
Rifampicin	: 450mg
Pyrazinamide	: 1.5g

Daily after meal for 2 months.

Followed by (2 drugs)

Thioacetazone : 150mg

INH : 300mg

Daily after meal for 6 months.

Total period 8 months.

- Note: 1. Where Thioacetazone is not tolerated,
Ethambutol can be substituted
(Dose: 15-25mg/kg body weight).
2. Doses stated are for adults
3. Ethambutol is not recommended for
children below 12 years of age.

